DOCUMENT RESUME

ED 443 823 TM 031 224

TITLE	Education Policy Analysis, 1999: Resources for Lifelong Learning, Early Childhood Education and Care, Technology in Education, Tertiary Education.
INSTITUTION	Organisation for Economic Cooperation and Development, Paris (France). Centre for Educational Research and Innovation.
ISBN	ISBN-92-64-17136-3
PUB DATE	1999-00-00
NOTE	99p.; Published in French under the title "Analyse des Politiques d'Education."
AVAILABLE FROM	Organisation for Economic Co-Operation and Development, Paris, France. Web site: www.oecd.org.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Comparative Analysis; *Early Childhood Education; *Educational Policy; Educational Technology; Elementary Secondary Education; Foreign Countries; International Education; *Lifelong Learning; Policy Formation; *Postsecondary Education
IDENTIFIERS	Organisation for Economic Cooperation Development

ABSTRACT

In its Program for International Student Assessment (PISA), the Organisation for Economic Co-Operation and Development is developing an instrument to compare across countries the quality of outcomes produced by schools. This document explores some issues related to academic achievement. Chapter 1, "Resources for Lifelong Learning: What Might Be Needed and How It Might Be Funded," considers projections of growth in participation in formal education and training to meet lifelong learning targets and the implications for educational costs. Chapter 2, "Early Childhood Education and Care: Getting the Most from the Investment," explores policy options to secure the benefits of early childhood education and care. Chapter 3, "Technology in Education: Trends, Investment, Access, and Use," discusses uses of information and communication technologies in education. Chapter 4, "Tertiary Education: Extending the Benefits of Growth to New Groups," explores tracking participation from under-represented groups in tertiary education. A statistical appendix contains data for the figures. (Contains 11 boxes, 22 figures, and 7 tables.) (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 443 823

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

S. Edam

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

CENTRE FOR EDUCATIONAL RESEARCH AND INNOVATION

EDUCATION POLICY ANALYSIS 1999

RESOURCES FOR LIFELONG LEARNING

EARLY CHILDHOOD EDUCATION AND CARE

TECHNOLOGY IN EDUCATION

TERTIARY EDUCATION

TM031224

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

OECD

2 BEST COPY AVAILABLE

CENTRE FOR EDUCATIONAL RESEARCH AND INNOVATION

EDUCATION POLICY ANALYSIS

1999

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996) and Korea (12th December 1996). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

The Centre for Educational Research and Innovation was created in June 1968 by the Council of the Organisation for Economic Co-operation and Development and all Member countries of the OECD are participants.

The main objectives of the Centre are as follows:

- *analyse and develop research, innovation and key indicators in current and emerging education and learning issues, and their links to other sectors of policy;*
- *explore forward-looking coherent approaches to education and learning in the context of national and international cultural, social and economic change; and*
- *facilitate practical co-operation among Member countries and, where relevant, with non-member countries, in order to seek solutions and exchange views of educational problems of common interest.*

The Centre functions within the Organisation for Economic Co-operation and Development in accordance with the decisions of the Council of the Organisation, under the authority of the Secretary-General. It is supervised by a Governing Board composed of one national expert in its field of competence from each of the countries participating in its programme of work.

Publié en français sous le titre :

ANALYSE DES POLITIQUES D'EDUCATION
Édition 1999

© OECD 1999
Permission to reproduce a portion of this work for non-commercial purposes or classroom use should be obtained through the Centre français d'exploitation du droit de copie (CFC), 20, rue des Grands-Augustins, 75006 Paris, France, Tel. (33-1) 44 07 47 70, Fax (33-1) 46 34 67 19, for every country except the United States. In the United States permission should be obtained through the Copyright Clearance Center, Customer Service, (508)750-8400, 222 Rosewood Drive, Danvers, MA 01923 USA, or CCC Online: http://www.copyright.com/. All other applications for permission to reproduce or translate all or part of this book should be made to OECD Publications, 2, rue André-Pascal, 75775 Paris Cedex 16, France.

TABLE OF CONTENTS

INTRODUCTION 5

Chapter 1
RESOURCES FOR LIFELONG LEARNING: What Might be Needed and How Might it be Found?

Summary 7

1. Introduction 8
2. Resource challenges posed by the lifelong learning mandate 8
3. Estimating direct costs of lifelong learning 12
4. The will and means to pay for lifelong learning 22
5. Conclusions 23
References 26

Chapter 2
EARLY CHILDHOOD EDUCATION AND CARE: Getting the Most from the Investment

Summary 27

1. Introduction 28
2. What does research tell us about the case for early intervention? 28
3. What are the major policy dimensions in early childhood education and care? 34
4. Conclusions 44
References 45

Chapter 3
TECHNOLOGY IN EDUCATION: Trends, Investment, Access and Use

Summary 47

1. Introduction 48
2. Investment in ICT in education 49
3. Access to ICT in education 51
4. Use of ICT in education 57
5. Conclusions 61
References 63

Chapter 4
TERTIARY EDUCATION: Extending the Benefits of Growth to New Groups

Summary 65

1. Introduction 66
2. Extending access 67
3. Extending participation in a wider range of tertiary-level learning options 76
4. Conclusions 83
References 83

STATISTICAL ANNEX: Data for the figures 85

LIST OF BOXES, FIGURES AND TABLES

BOXES

1.1. Costs of lifelong learning: a conceptual framework ... 10
1.2. Strengthening the incentives and means for investing in lifelong learning ... 24

2.1. Early childhood education and care: evolution and definition ... 30
2.2. Who works with children in ECEC programmes? ... 38

3.1. Examples of public-private partnerships promoting the use of ICT in education ... 51
3.2. Examples of agreement between school authorities and telecommunications companies on discounts of telecommunications costs ... 52
3.3. Time spent on teacher ICT training ... 59

4.1. Assessing trends in access and participation in tertiary education ... 70
4.2. Current strategies to improve access ... 71
4.3. Policies and programmes to open up new patterns of participation over a lifetime ... 75
4.4. Current strategies to promote learning and progress for all students ... 82

FIGURES

1.1. Changes in spending for education, 1990-95 ... 9
1.2. Changes in enrolments between 1995 and 2005, under three scenarios ... 14
1.3. Proportion of the adult population 25-64 years old that is "at risk" ... 16
1.4. Trends in expenditure per student and enrolment, 1990-95 ... 21

2.1. Educational expectancy of children aged 3 to 6, 1996 ... 29
2.2. Participation by age of children aged 3 to 6, 1996 ... 36
2.3. Financing pre-primary education, 1995 ... 39
2.4. Percentage of mothers aged 30 to 39 who work when their children are under 5, 1986 and 1997 ... 41

3.1. Spending on learning resources in primary and secondary education ... 49
3.2. Number of students per computer ... 53
3.3. Percentage of schools connected to the Internet ... 55
3.4. School poverty and Internet use in the United States, 1996 ... 56
3.5. Students' computer use, 1995 ... 58
3.6. Teachers' Internet use in the United States, 1998 ... 60
3.7. Students' Internet use in the United States, 1998 ... 60

4.1. Growth in tertiary education enrolment, 1990-96 ... 66
4.2a/b. Participation in and completion of tertiary education by parents' educational level, 1994-95 ... 67/68
4.3. Growth in participation rate for young adults in tertiary education by socio-economic group, through the mid-1990s ... 69
4.4a. Adult participation in tertiary education, 1994-95 ... 73
4.4b. Adult participation in tertiary education, broken down by age, gender, educational attainment and occupation, 1994-95 ... 74
4.5. Split between university and other tertiary education, 1990 and 1996 ... 77
4.6a. Share of women in first-degree or diploma programmes in tertiary education, early to mid-1990s ... 78
4.6b. Share of women in all post-graduate enrolment, 1990 and 1996 ... 79

TABLES

1.1. Policy targets for adults, 1996 ... 17
1.2. Lifetime training expectancy for adults 25-64 year olds, 1994-95 ... 18
1.3. Closing the training gap experienced by poorly qualified adults 25-64 years old, 1994-95 ... 19

2.1. Studies that have looked for benefits from ECEC ... 32
2.2. Summary of maternity and parental leave in selected OECD countries ... 42

3.1. Percentage of computers with multimedia capacity, 1998 ... 54

4.1. Access to public subsidies and learning resources for tertiary education students from low and high socio-economic groups by type of institution or programme: France and the United States, mid-1990s ... 81

INTRODUCTION

The decade of the 1990s has witnessed a continuation of growth in participation in education and training – rapid and dramatic in OECD countries which had lagged behind, but consistent across the OECD area. The expansion has been marked by increased participation in a widening range of learning activities and by an extension of the age range of participants, from the earliest years through later adulthood.

But, a new dynamic of increased demand and response is emerging. As the desire for education continues to grow, the debate about goals for learning does not abate. In this perspective, the chapters in this volume offer a strong, common underlying theme: more investment may be needed to meet the demand, but it is the nature and quality of that investment that counts. The challenge, in this era of expanding, deepening and diversifying demand for learning over a lifetime, is how best to meet the volume demand while ensuring that the nature and types of learning respond effectively to needs.

The new quality imperative, with its strong focus on outcomes, responds to a desire for increased accountability for the use of public funds. More generally, it reflects a wider concern about performance levels, either that might be falling or that are not rising to meet the needs of today or tomorrow – for individuals, for the economies in which they work and for the societies in which they live. In this perspective, systematic monitoring of outcomes has the potential to encourage flexibility in education systems by remitting more decisions about the management of inputs and educational processes to regions and institutions, while holding them accountable for the outcomes achieved.

The interest in direct monitoring of achievement represents a significant shift in policy orientation, but raises the question about what outcomes to monitor. The dimensions of the wider debate refer to:

- ***learning*** at foundation levels, from early childhood education and care through the first years of tertiary education. Programmes must be organised to ensure that every individual acquires basic knowledge and literacy, the essential building blocks on which the ability to function in complex modern societies now depends. To those ends, policies will need to foster appropriate development and learning from the early years, and efforts to address the causes and consequences of drop-out and failure at all levels of initial education.

- a broad orientation on outcomes, to include knowledge in basic subjects but also ***generic*** or ***life skills*** identified as problem-solving, teamwork and learning skills and a motivation or disposition for learning at older ages.

- a wide range of ***learning objectives***, within and among the various learning opportunities and activities. Lifelong learning encompasses a common core of knowledge and skills, but also a wide diversity in learning interests, backgrounds and needs to be served.

From the early 1990s, the OECD has undertaken to identify and measure a wider range of outcomes, initially through the OECD and Statistics Canada International Adult Literacy Surveys of 1994-97. Through a common set of tests administered in 22 countries, direct assessments of literacy skills to process written and quantitative information continue to be reported and analysed. Building on that work, countries are now developing the International Life Skills Survey, to assess as well the levels of such generic skills as team work, problem solving, ICT use and learning to learn.

A strengthened emphasis on quality and outcomes makes it more important to have a better understanding of the goals being sought and the contributions of a country's education and training

effort to the realisation of these goals. This perspective has motivated the OECDs Programme for International Student Assessment (PISA). For the first time, we are developing an instrument to compare across countries the quality of outcomes produced by our school systems, rather than just the number of people processed (educational participation) or their internal effectiveness (curriculum-based tests). The most unique and powerful features of PISA reside in a conceptual framework that aims to provide measures on the extent to which education systems are preparing young people to play constructive roles as citizens in society and the economy. PISA, with its broad approach to the definition of assessments rather than drawing on definitions that are limited to specific curricula or that are specified solely in terms of subject-matter knowledge, represents a major departure from prior international assessments of learning. Importantly, it provides an approach which focuses on the public and policy interests in ensuring that young people have and are able to use the knowledge needed for functioning in today's economy and society.

PISA also will fulfill an important need for regular, policy-oriented comparative information on outcomes. International comparative assessments of achievement already figure largely in national policy debates and educational practice in a number of OECD countries. PISA is providing a new basis for policy dialogue and collaboration in defining and operationalising educational goals – in innovative ways that reflect judgments about the kind of skills that are relevant to adult life. It will offer an opportunity to identify and assess gaps in national curricula, and it will provide inputs for benchmarking, standard-setting and evaluation; insights into the mix of factors which contribute to the development of competency, and how these factors operate similarly or differently among the countries; and the generation of a better understanding of the causes and consequences of the observed skill data.

In supporting a shift in policy focus from the inputs used in education systems and institutions to learning outcomes, we aim through PISA to assist countries seeking to bring about improvements in schooling and better preparation for young people as they enter an adult life of rapid change and deepening global interdependence. ■

T. J. Alexander
Director, Directorate for Education, Employment, Labour and Social Affairs

Education Policy Analysis is released at a different date from *Education at a Glance* – OECD *Indicators*. This reflects the continuing development of two distinctive, but highly complementary publications. While *Education Policy Analysis* draws on a wide range of information and findings generated in the OECD education work programme, it continues to make use of the OECD Education Database. Readers are referred to *Education at a Glance* – OECD *Indicators* 1998 for details on the definitions, methodologies and measures used.

CHAPTER 1

RESOURCES FOR LIFELONG LEARNING: What might be needed and how might it be found?

Summary

Education spending has increased during the 1990s, yet the promise of "lifelong learning for all" implies a further expansion of learning opportunities. How much will this cost, and who will pay?

The cost of expansion depends not only on its volume but also on whether new students cost more on average than existing ones. Average costs may fall if rising rolls reduce spare capacity, if learning technology improves, or if new adult learning is more cost-effective. Conversely, extending learning opportunities to harder to serve groups or improving quality can raise unit costs.

In practice, the *quantity* of extra provision need not always be proportionate to increases in participation rates, because youth cohorts are in many cases shrinking. Looking for example at what it would take for countries to raise youth participation to a "good practice level" (defined as the rate in the fourth-highest country in 1995) in the decade to 2005:

- Half of countries could achieve good practice in early childhood participation without raising enrolments by more than 20%;
- One-third of countries would not have to raise 15-19 year old enrolments at all, and most of the rest by less than 20%;
- But tertiary education expansion would have to be greatest, with two-fifths of countries needing to raise enrolments of 20-24 year-olds by at least 20%, and a quarter by at least 50%.

In the case of adult training, targeted groups could participate more without huge increases in total provision. In most countries, under 20% more training hours would be needed for low-educated adults to participate as much as those with medium qualifications.

The *price* of learning, in terms of spending per student, has in formal education often risen during periods of expansion, multiplying the cost:

- In *pre-primary education*, price has almost universally risen faster than any enrolment growth;
- Unit costs in *secondary education* have tended to rise, whether rolls are rising or falling;
- In *tertiary education* there has more often been some decline in price, but the main impact on costs is a bigger rise in enrolment.

The issue of who pays for lifelong learning remains unresolved, but there is a strong case for encouraging a greater private contribution. One way of doing this is to increase incentives to invest, for example by making education outcomes more visible in the hope of creating more predictable returns. Another is to create mechanisms that make it easier to finance private investment.

1 INTRODUCTION

To achieve the objective of "lifelong learning for all", OECD countries will have to expand the supply of formal and non-formal learning opportunities. But how will the resource implications be addressed? Spending on education and training has been relatively stable as a percentage of GDP in most OECD countries in the 1990s, averaging about 6% in 1995. As the right hand side of Figure 1.1 shows, public expenditure for education institutions has risen in absolute terms, in four-fifths of the countries for which data are available, with a rise in private expenditure usually exceeding the rise in public expenditure. In nearly all countries in which public expenditure grew, it appears that the increase in education spending has been made possible by a relative shift in public budgets in favour of education. To ensure in future that spending is sufficient to meet the ambitious lifelong learning objective, governments will have to consider first how existing resources might potentially go further and second how to attract new resources where necessary.

As envisaged by the OECD's education, labour and finance ministers, lifelong learning extends from the early years through adult life; includes schooling, other organised education and training and non-formal learning; builds on complementaries and linkages among providers and partners in its organisation and financing; and emphasises the active, primary role of the individual learner. Ministers' initial commitment to lifelong learning, adopted in 1996 and 1997[1] lacked precise operational meaning but stressed the importance of addressing inevitable resourcing questions.[2] As well as implying the transformation and, frequently, expansion of existing capacity of formal education systems, lifelong learning also entails creating and expanding learning opportunities outside the usual settings in which education has been delivered. In the short and medium term, some countries aim to raise participation rates in early childhood, primary, secondary, and/or tertiary education to achieve the goal of building adequate foundation skills. In nearly all countries it is seen as necessary to expand opportunities for adults wishing to participate in lifelong learning, either in settings within formal education systems, or in non-formal settings in the workplace or the community.[3] In addition, there is a range of qualitative goals and objectives related to changing the content and accessibility of existing opportunities (OECD, 1998*b*).

This chapter draws on recent evidence on participation and costs to elaborate on the resource challenge that the lifelong learning mandate poses, and examines how it is being – or might be – met. The next section describes the dual nature of the challenge, resting firstly on the question of how much it costs to meet the objective, and secondly on the issue of who pays. Section 3 then looks in more detail at how the first of these issues may play out in practice, considering evidence of the volume and price of provision that may be needed. Section 4 gives an overview of main considerations on the issue of who pays, with reference to approaches adopted in countries.

2 RESOURCE CHALLENGES POSED BY THE LIFELONG LEARNING MANDATE

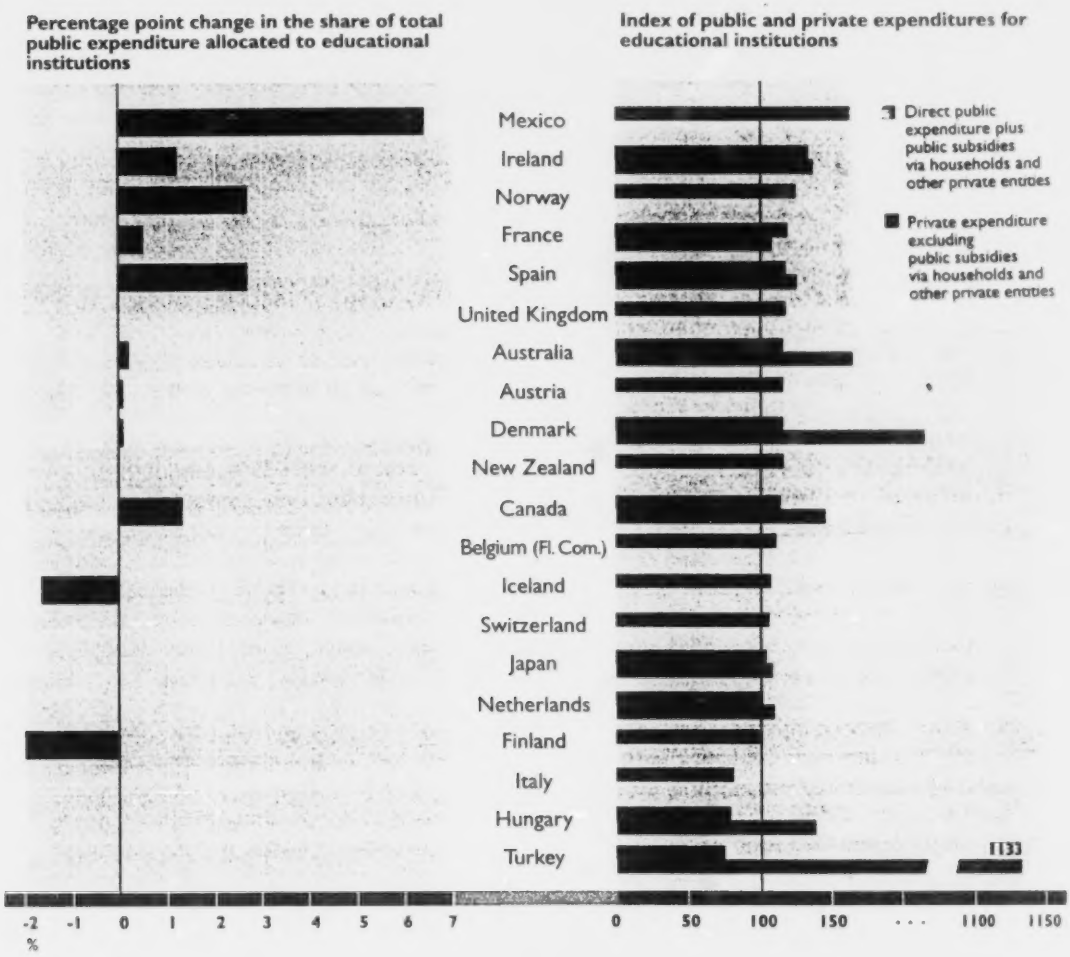
In contrast to other far-reaching reforms or new initiatives in education, the lifelong learning mandate poses a particularly complex resource challenge because it changes so many parameters at once. It implies: quantitative expansion of learning opportunities to widen access to all; qualitative changes in the content of existing educational activities; qualitatively and quantitatively different learning activities and new settings; and changes in the timing of learning activities over a lifetime. These developments imply, in turn, a strong likelihood of changes in the costs of providing and participating in

1. Communiqués of Meetings of OECD Education Ministers (1996), OECD Council (1996, 1997), OECD Labour Ministers (1997).

2. See OECD (1996). Education Ministers took note of the wider economic and social costs of *not* pursuing policies to achieve lifelong learning for all, among which weak economic performance, higher unemployment and risks to the social fabric.

3. Indeed, some countries are giving particular attention to learning taking place outside of formal education, in the UK for example, through such policies as Individual Learning Accounts, Investors in People and accreditation of workplace learning. See OECD (1998*b*) for an overview of priorities in national lifelong learning initiatives.

Figure 1.1
Changes in spending for education, 1990-95 (1990 = 100)



Education spending is growing in absolute terms in most countries, thanks to increased private spending and a reallocation of public resources into education and training.

Countries are ranked in descending order of rises in public expenditures for educational institutions.

Source: OECD Education Database
Data for Figure 1.1, page 86

education, training and learning activities, and increases in the total outlays by society for such activities. Policy decisions to constrain growth in public expenditure, combined with the presence of substantial private returns to certain aspects of lifelong learning, imply a mixed finance strategy which draws more from private sources to meet resource requirements.

Evaluating the resource implications of the lifelong learning mandate poses formidable analytical challenges. First, goals must be translated into specific operational objectives. But, these range widely. Should there be increases in participation in early childhood education and care? more seniors in adult education? more learning on the job? qualitative changes in the contents, methods

BEST COPY AVAILABLE

BOX 1.1 COSTS OF LIFELONG LEARNING: A CONCEPTUAL FRAMEWORK

There are a few broad classes of costs of lifelong learning that are incurred by different actors. Their relative importance and who bears them differ according to the lifelong learning sector being considered. The costs can be broadly classified as follows:

Direct costs are outlays made for providing or participating in education and training. They are met, for example, by expenditures of public authorities for building and operating schools (capital and current expenditure); tuition charges paid by students; training fees paid by employers to training vendors.

Indirect costs are those associated with learning, but are not a part of direct learning process. They take the form, for example, of living costs incurred by a tertiary education student who has to establish his/her own household; allowances or other subsidies provided by public authorities to help defray such costs; the transportation costs incurred in placing a child in a daycare centre.

Opportunity costs are reflected in the value of work or leisure that are foregone in order to devote time for education/training/learning. They take the form, for example, of earnings that students forego when they delay entry to or withdraw from the labour force to participate in tertiary education, for example, or production that employers forego when workers are released from their jobs to participate in training, or the leisure that adults forego when they opt to enrol in a night course. Opportunity costs also could take the form of tax revenues that are foregone by public authorities because of foregone earnings by individuals and employers.

What does increasing participation in lifelong learning imply for each of these classes of costs? That depends first on whether direct costs are high at the margin. But the cost implications of lifelong learning strategies depend also on the extent to which strategies lead to shifts in the timing and institutional settings in which learning occurs. One of the arguments in favour of increasing pre-school education is that it decreases the likelihood of failure in elementary and secondary education (see Chapter 2). To the extent that experience proves this true, the costs of expanding participation in pre-school education may be offset by lower costs at the secondary level. As learning opportunities for adults expand and become more established as a norm, it is possible that enrolments in tertiary education immediately following secondary education would decline, as some individuals postpone at least some part of their tertiary-level studies until after initial entry into the labour market (see Chapter 4). At the same time, improved performance at the secondary level may lead to higher staying on rates (and increased costs). In all cases, the effects on indirect and opportunity costs need also to be taken into account. Part-time study while working is associated with a smaller earnings loss than full-time study, for example. And, when calculating the cost of providing early childhood education and care, the direct cost may be offset by some savings for parents in the form of reduced cost for childcare when they are studying themselves.

For a fuller discussion of the conceptual, measurement, and survey issues associated with the costs of training, see OECD (1997b).

and contexts of learning? structural changes which permit or support changes in the timing of learning, such as credit transfer, recognition of skills, new short first tertiary-level qualifications? Then, the costs of these changes need to be estimated. For certain changes in the formal education system, one can start with straightforward estimates of the volume growth within existing institutional arrangements that is needed to meet particular participation objectives. But estimates of costs associated with this growth would not reflect, for example, potential economies of scale or possible programmatic changes that are needed to ensure that upper secondary education capacity is expanded in such a way that young people who otherwise might leave school early are persuaded to remain.

As soon as the focus shifts to increasing participation in lifelong learning outside the formal education sector, the measurement of costs becomes yet more complex. The learning process – and its costs – are less easily observed since the settings in which learning occurs are less clearly defined, and learning is more likely to be mixed with production and other activities. Furthermore, it is necessary to take into account more perspectives from which to define costs: the perspectives of individuals and employers, as well as the state. Box 1.1 provides a summary of the principal components of cost that are likely to have a bearing on the resources required for lifelong learning. Finally, as lifelong learning policies eventually lead to more comprehensive articulation between different sectors of formal education and between "formal" and "non-formal" settings, the resource issues may evolve in fundamentally different ways. The volume and timing of enrolment may change where different forms of learning substitute for or complement one another and learners and their families make choices which depart from education and training in traditional settings and pathways. Cost functions may evolve as teaching and learning methods from non-formal settings are applied in formal settings, and vice versa.

In the near and medium term, however, steps taken to advance the lifelong learning mandate will rely on existing institutional arrangements. At least over the shorter time period, volume and cost estimates based on existing provision can give useful first approximations of lifelong learning's resource challenge.

In brief, implementing the lifelong learning mandate is likely to require an increase in the total quantity of learning, with the increase taking the form, for example, of higher participation and completion rates in tertiary education, or higher participation rates on the part of poorly qualified adults in remedial education programmes.[4] Higher levels of participation will increase overall costs, although the magnitude of the increases will depend on two factors: how much extra provision is needed and how costly it is per unit (e.g. student hour). The additional costs will be relatively lower if provision for the added participants can use existing available capacity, as may be the case for some forms of distance learning for example. Alternatively, the additional costs will be relatively greater if the provision needed for the added participants must be organised in different ways, as may be the case to overcome a lack of interest and basic skills for learning for certain groups of poorly qualified adults.

An underlying issue will be whether expansion involves more of the same (e.g. more people in initial tertiary education) or new patterns of lifelong learning (e.g. greater growth in part-time adult learning than full-time initial studies through the first years of tertiary education). Such changes might entail shifts in the timing of the larger volume of learning over the life-cycle, and involve fundamental changes in the content, mode, and cost structure of learning. The volume and cost estimates in Section 3 below necessarily concentrate on existing patterns of participation and organisation, for which greater certainty is possible, but it is also important to consider whether new learning patterns might work out more cost-effective.

4. These are imperfect measures. Participation in educational programmes is only a proxy for the actual acquisition of knowledge and skills or for other learning outcomes.

Situating the resource challenge in the context of current policy and practice

OECD Member countries already devote considerable resources to education and training. In 1995, public spending on education amounted to 4.7% of GDP, for all OECD countries taken together. Governments spent an additional 0.13% on subsidies to households (e.g. student grants), while families and other private entities spent a further 1.2% of GDP (e.g. on fees). Public expenditure on education represents a sizeable share of total public spending, ranging from 17% in Norway, to 8% in Greece.[5]

If recent past experience is any guide, the prospects for resource growth in the formal education sector seem likely to depend on increasing private contributions. Although trends in expenditure on formal education during the 1990s have been up, growth in private contributions has been proportionately higher than growth in public contributions (Figure 1.1). Moreover, as total public outlays have first risen, and then declined as a share of nominal GDP during the 1990s, growth in public expenditure on education has been made possible only by relative or absolute cuts in other forms of public expenditure.

It is more difficult to make firm estimates of past and current spending on work-related training. The more observable public outlays comprise only a small share of total costs; other less observable costs are incurred by multiple actors. Indirect costs and, particularly, opportunity costs in the form of production and/or wages that are foregone during training, comprise a larger share of total costs than in initial education, and are difficult to observe. Estimates of such costs usually vary between 1 and 2% of total payroll costs (for example, Communautés européennes, 1999). Reliable trend data on expenditure for work-related training are not available.

In order to provide a more solid basis for evaluating the potential costs of lifelong learning, the analysis below focuses on possible scenarios for the subset of direct costs associated with volume growth in formal education and training. It considers how costs could vary with different objectives and in view of evidence on recent trends in per student expenditure.

3. ESTIMATING DIRECT COSTS OF LIFELONG LEARNING

It is virtually impossible to estimate the cost of the lifelong learning mandate in its entirety. Because the concept of lifelong learning is so elastic and implies simultaneous changes in a number of parameters, the estimated cost of lifelong learning is, to a large degree, indeterminate. Indeed, judging from the early experience of several OECD Member countries implementing lifelong learning policies, some countries are going through an initial process of what might be characterised as "trying on" different conceptions of lifelong learning to see which one "fits" in view of existing arrangements, traditions, and social and economic priorities. The choice of priorities and the programmatic implications are constrained by what is affordable. Furthermore, lifelong learning has more than quantitative dimensions. It is not merely increasing enrolments in one sector of education, or generating enrolments in totally new learning situations. It also takes the form of qualitatively different learning experiences in the classroom, changes in the timing and sequencing of formal education, and integration of learning with productive and leisure activities which have their own accompanying structures of costs and offsetting benefits.

But, as a departure point, it is possible to isolate certain components of lifelong learning, particularly those that are linked to existing patterns of participation and forms of provision in education and training, to build up some estimates of costs, and to consider how far these estimates are sensitive to changes in how lifelong learning objectives are defined. Indeed, insofar as some aspects of the lifelong learning mandate are associated with modest changes in familiar institutional arrangements and policy frameworks,

5. The data refer to expenditure on educational institutions (direct costs). See OECD (1998a) for detailed statistics on expenditure on formal education.

it is feasible to develop reference points for evaluating alternative scenarios and their resource requirements.

The simplest reference points can be based on two elements: changes in the rate at which individuals participate, and the "price" or "marginal cost" of increased participation. These two elements can be looked at more concretely by considering evidence, firstly, on past and projected participation and enrolment patterns, and secondly, on trends in certain average unit costs.

Estimating changes in volume of participation

a) Children and young adults

One of the clearest implications of the mandate for lifelong learning is the emphasis on strengthening the foundations acquired in initial education and training. In addition to the qualitative changes this implies in early childhood education and care, elementary, secondary, and tertiary education,[6] there are measurable quantitative dimensions. A number of countries are committed to raising participation and completion rates at different stages of education. But these policies are being implemented against a backdrop of demographic change which in some cases can offset increased participation. Where the number of 17-19 year-olds is declining, for example, overall enrolments in upper secondary education will not rise as much as participation rates. What then is likely to happen to total enrolments over the next decade, in view of lifelong learning mandates and demographic developments, and what does that imply for how modest or ambitious the resource requirements might be?

Figure 1.2 projects the increases in enrolment levels between 1995 and 2005 that would exist under three scenarios of participation rates in three age groups: 0-5 years old, 15-19 years old and 20-24 years old. The age groups examined correspond roughly to three stages of formal education: early childhood education and care, upper secondary education and tertiary education, although it is important to keep in mind differences among countries in structures and patterns of participation for each stage. The first scenario is that participation remains constant, the other two can be characterised as modest and more ambitious strategies for implementing lifelong learning.

- *Scenario* A assumes that participation rates observed in 1995 remain unchanged through 2005. This would reflect a situation in which policy makers, as well as individuals and/or their parents did nothing to change the likelihood of young children to participate in some form of early childhood education and care, for example. This "policy neutral" scenario is useful in showing the effects of demography alone: any recent rise in the birth rate, for example, would lead to a proportionate increase in enrolment aged 0-5.

- *Scenario* B depicts enrolment growth in the OECD area under a modest strategy for implementing lifelong learning. It assumes that in those countries in which participation rates are "low" – below the OECD median observed in 1995 – a combination of policy action and/or change in behaviour leads to increases in participation rates to the 1995 median level. The effect of increased participation is combined with that of demography to determine the enrolment change.

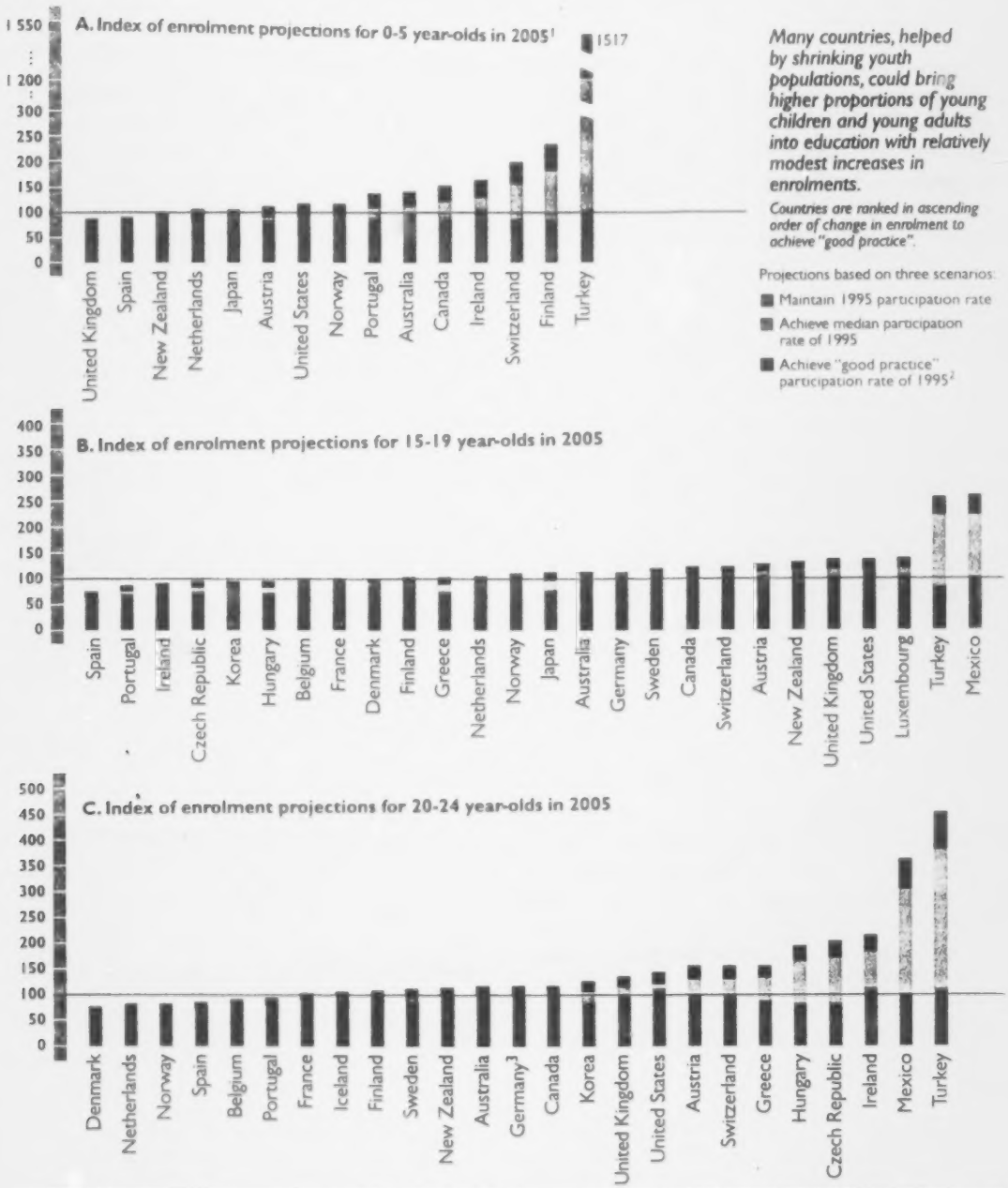
- *Scenario* C reflects a strategy that aims for a more ambitious target, to achieve participation rates that could be described as "good practice" – as good as the fourth best country.

Figure 1.2 summarises the projected changes between 1995 and 2005 in enrolments under the different scenarios. More details can be found in the Statistical Annex at the end of the volume.

The data would suggest that many OECD Member countries will have the manoeuvering room to set ambitious targets for lifelong learning, at least with respect to strengthening foundations for lifelong learning by expanding participation in the formal education system.

6. See Chapters 2 and 4. See also OECD (1998*b* and 1998*c*).

Figure 1.2 **Changes in enrolments between 1995 and 2005, under three scenarios** (1995 = 100)



1. Enrolment in non-formal provision of early childhood education is not included; coverage of participation in programmes organised privately or outside the auspices of Education Ministries is uneven.
2. "Good practice" countries are United Kingdom for 0-5 year-olds, France for 15-19 year-olds and Norway for 20-24 year-olds.
3. Enrolment in university doctoral programmes is not included.

Sources: OECD Education Database and United Nations demographic estimates and projections.

Data for Figure 1.2, page 86.

At the pre-school level, stable or slightly declining birth-rates mean that nearly all countries could sustain 1995 participation rates of children under the age of 6 without expanding capacity. Many would have substantial excess capacity (with projected enrolments of 90% or less of the 1995 levels). Ireland, Japan, and Turkey are the only countries that would need to expand capacity, in order to keep participation rates at their 1995 levels. In half of the countries for which data are available, it would be possible to achieve "good practice" participation rates, with no or only limited (less than 20%) expansion of current capacity.[7]

The effects of the evolution of the size of cohorts are more mixed for youths. While half of all countries could sustain their 1995 enrolment levels for youth aged 15-19 through 2005 with no increased capacity, the rest would require some expansion. However, such expansion would be modest, substantially less than 20%. Moreover, one-third could achieve *good practice* levels of participation with virtually no expansion in existing capacity, and most of the rest could achieve such levels with only a 20% expansion of capacity. This favourable situation reflects the fact that in most countries, the great majority of young people are already remaining in education up to the age of at least 17 or 18, so the scope for further expansion is relatively small.

The scenarios for enrolments of young adults aged 20-24 are more complex, partly because participation is more variable. If the participation rates that were observed in 1995 remain unchanged, enrolments of 20-24 year-olds will decline in all countries for which data are available except Canada, Finland, Ireland, Mexico, Turkey and the United States. In all other countries, the numbers enrolled will decline. But raising participation rates to the *median* or *good practice* levels observed in 1995 would require substantial expansion of capacity in many countries. And, it should be noted that the 20 to 24 year old age group does not fully comprise the age-participation profile of tertiary education students (see Chapter 4). If these wider patterns of participation are taken into account, the scale of necessary expansion could be large indeed.

b) Adults

It is comparatively difficult to estimate the change in the volume of learning opportunities for adults that is needed to implement the lifelong learning mandate. In contrast to goals to raise upper secondary completion rates, for example, the goals for adult learning are difficult to specify. First, there is neither an institutional framework (such as secondary education) for defining learning activity, nor a qualifications structure (analogous to degrees or diplomas) for signalling learning that has occurred in various settings. Second, there is scant systematic evidence on the time required to achieve different learning gains, whether those gains are measured in terms of formal education qualifications, or some other measure of learning outcomes.

In the absence of such measures of learning outcomes, one approach to expressing the lifelong learning goals and objectives for adults is to use two indicators:

- One expresses goals and objectives in terms of the number of adults who are at risk, that is, those who fall below a certain threshold level of educational attainment and/or literacy, and who therefore would be high priority targets for lifelong learning measures to raise their educational attainment levels.
- The other expresses goals and objectives in terms of needed increases in participation in lifelong learning activities by adults with low educational attainment/literacy levels, in order to bring them up to levels of more qualified persons.

Although neither measure translates into enrolment targets for formal education systems and they do not include substantial demand from already highly-educated adults seeking to upgrade their skills, they do provide reference points for different approaches to estimating volume growth in learning for a key target group of adults.

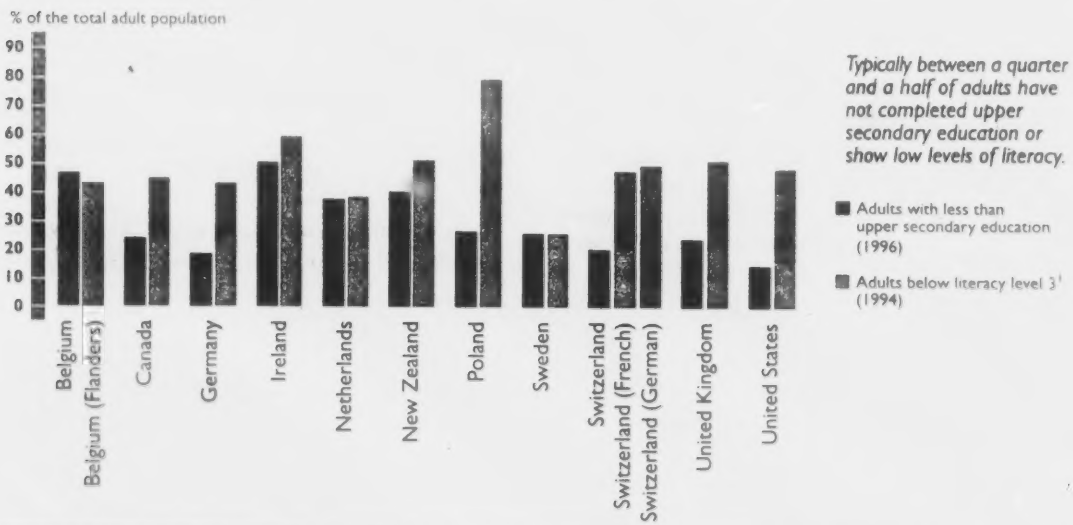
7. The data may not include participation of very young children or participation in programmes organised outside the auspices of education ministries. Such participation is substantial in some countries (e.g. the Netherlands). See Chapter 2.

In considering the first approach, one needs to know first how many adults are "at-risk", and then make a judgement as to how many of them should be served. Figure 1.3 presents alternative ways of measuring the number at risk. The criteria for determining whether someone is "at-risk" is whether they have completed upper secondary education or acquired a vocational qualification (such as an apprenticeship certificate).[8] For those countries that have participated in the OECD and Statistics Canada International Adult Literacy Survey (IALS), it is also possible to consider how many have not reached a target level of literacy. In the IALS study, proficiency at literacy level 3 is adopted as a desirable level to ensure that an adult will be able to confront the complex challenges of the modern world.[9] Figure 1.3 expresses the size of the "at-risk" population as a proportion of the adult population.

Looking further at the size of the population lacking upper-secondary education, what are the implications for more and for less ambitious targets regarding the proportion of that population that is to be served, and how it is to be served? Table 1.1A estimates the proportion of persons in each country[10] for whom educational attainment levels would need to be raised, in order to reduce the size of the "at-risk" population to the *median* level of all countries (as observed in 1995), and to a *good practice* level (fourth best of all countries observed in 1995). For example, to meet a *median* level policy target, Austria would not need to serve any more adults than already served, because the proportion of adults with less than a secondary education is lower than the median for all countries. However, in order to achieve a *good practice* policy target, an additional 10.1% of the adult population would have to be served.

In order to provide reference points for evaluating these figures, Table 1.1B presents ratios that relate the number of adults to be served under

Figure 1.3
Proportion of the adult population 25-64 years old that is "at risk"



1. Estimated from the International Adult Literacy Survey (IALS) results for the document scale which tested the knowledge and skills required to locate and use information contained in various formats such as official forms, timetables, maps and charts. Performance is assigned to one of five literacy levels; literacy level 1 indicates least proficient, literacy level 5 indicates most proficient.

Sources: OECD Education Database; OECD and Statistics Canada, International Adult Literacy Survey (IALS), 1994-95.

Data for Figure 1.3, page 88.

Table 1.1
Policy targets for adults, 1996

A. Share of the adult population to be served under different policy targets

	Policy target	
	Median[1]	Good practice[2]
	36.8	18.5
Australia	6.2	24.5
Austria	0.0	10.1
Belgium	9.7	28.0
Canada	0.0	5.1
Czech Republic	0.0	0.0
Denmark	0.0	15.4
Finland	0.0	14.7
France	2.9	21.2
Germany	0.0	0.0
Greece	19.0	37.3
Hungary	0.0	18.3
Ireland	12.9	31.2
Italy	25.0	43.3
Korea	2.1	20.4
Luxembourg	33.8	52.2
Netherlands	0.6	18.9
New Zealand	3.0	21.3
Norway	0.0	0.0
Poland[3]	0.0	7.7
Portugal	42.7	61.1
Spain	32.9	51.2
Sweden	0.0	7.3
Switzerland	0.0	1.3
United Kingdom	0.0	5.2
United States	0.0	0.0

B. Ratio of the adult population to be served under different policy targets, compared to secondary education enrolment

	Policy target	
	Median	Good practice
Australia	0.25	1.01
Austria	0.00	0.57
Belgium	0.50	1.43
Canada	0.00	0.32
Czech Republic	0.00	0.00
Denmark	0.00	0.94
Finland	0.00	0.89
France	0.15	1.06
Germany	0.00	0.00
Greece	1.23	2.42
Hungary	0.00	0.87
Ireland	0.56	1.35
Italy	1.67	2.90
Korea	0.11	1.05
Luxembourg	2.82	4.35
Netherlands	0.04	1.10
New Zealand	0.12	0.86
Norway	0.00	0.00
Poland[3]	0.00	0.58
Portugal	2.31	3.30
Spain	1.58	2.45
Sweden	0.00	0.40
Switzerland	0.00	0.09
United Kingdom	0.00	0.23
United States	0.00	0.00

1. Calculated as a percentage of the adult population with less than upper secondary education, minus the median value for all countries. For values less than 0, the policy target is equal to 0.
2. Calculated as a percentage of the adult population with less than upper secondary education, minus the value for the country with the fourth lowest share of the population having less than upper secondary education (Germany). For values less than 0, the policy target is equal to 0.
3. 1995.

Sources: OECD Education Database, country-provided data.

each scenario to the number of persons enrolled in secondary education. Thus, in the case of Austria, achieving the *good practice* target would serve an adult population that amounts to slightly more than half of the secondary school population. In several countries, the number of adults who would be served by even modest policy targets would be large – substantially exceeding the secondary school population. These data provide order-of-magnitude estimates

8. No distinction is made for qualitative differences. In the UK, for example, anyone who has passed one GCSE is reported as having completed secondary education. If the reporting criteria were higher, a larger proportion of adults would be identified as "at risk".

9. The measure used is performance on the IALS document scale. Performance is assigned to one of five levels; literacy level 1 indicates least proficient; literacy level 5 indicates most proficient.

10. A wider range of countries is used here than in Figure 1.3, which includes only those that participated in IALS.

BEST COPY AVAILABLE

of the population that might be served under more and less ambitious policies. They do not, however, provide an indication of the volume increase in learning activities that would be needed.

The second approach frames the overall goal differently in order to estimate the volume of the increases in training participation that would be needed. Instead of identifying an "at-risk" population whose educational attainment level needs to be raised, it takes the distribution of educational attainment of the population as given and aims to raise the participation level of the "at-risk" population to the level of more advantaged adults. In so doing, it also provides estimates of the increase in training hours that would be needed to achieve certain lifelong learning goals and objectives.

Table 1.2, based on data from the 1994-95 International Adult Literacy Survey, indicates the number of hours that an individual can expect to spend in training over his or her working life according to the level of educational attainment. The data show that higher levels of educational attainment are associated with a greater number of training hours. In all countries, those with less than an upper secondary education receive substantially less training on average than those who have completed upper secondary education or more; in some countries the likelihood of getting training is increased by a factor of four or more for more educated groups. In Poland those who received tertiary education outside of universities spend more hours in training, on average, than those with university education. Analyses using other data on participation rates tell much the same story (OECD, 1999).

How much greater a volume of learning opportunities would be needed in order to raise the number of hours of training for poorly qualified individuals (less than an upper secondary education) to a par with adults who have a medium level of qualification (upper secondary education only)? Table 1.3 looks at the required increase in training hours. Part A of the table expresses this as a percentage of the total volume of training for all adults. As shown there, the total additional volume of

Table 1.2 Life-time training expectancy[1] for adults 25-64 years old, 1994-95
Mean number of hours per adult, by gender and educational attainment

	Total					Female					Male				
	All education levels	Below upper secondary	Upper secondary	Non-university tertiary	University	All education levels	Below upper secondary	Upper secondary	Non-university tertiary	University	All education levels	Below upper secondary	Upper secondary	Non-university tertiary	University
Belgium (Fland.)	478	111	623	877	1 194	387	111	584	822	1 097	565	120	663	891	1 328
Canada	2 109	1 115	1 420	2 863	5 444	2 264	826	1 531	1 546	6 464	2 198	1 360	1 528	4 011	3 085
Germany	1 833	1 397	2 361	2 027	2 668	2 013	1 731	2 896	701	3 130	1 639	1 102	1 701	3 337	1 873
Ireland	1 259	813	1 818	1 859	2 081	1 377	785	1 444	2 763	3 026	1 158	846	2 367	1 110	1 309
Netherlands	1 512	780	1 768	0	2 086	1 105	608	1 200	0	1 746	1 901	987	2 298	0	2 295
New Zealand	2 627	2 099	1 993	3 046	5 443	2 352	1 876	1 854	2 786	4 887	2 905	2 310	2 254	3 225	5 599
Poland	391	199	417	1 115	1 077	348	140	277	1 014	1 156	437	243	645	1 961	970
Switzerland (Fr.)	217	56	180	403	446	125	0	135	158	232	323	155	222	525	544
Switzerland (Ger.)	353	8	344	638	1 155	239	15	252	454	1 017	481	0	486	706	1 029
United Kingdom	1 666	926	1 937	3 331	3 339	1 425	664	1 820	3 583	3 509	1 906	1 236	2 071	2 907	3 230
United States	1 403	364	1 116	1 575	2 523	1 258	422	1 053	1 433	2 198	1 567	299	1 382	1 615	2 806

1. Training expectancy is the cumulation, over 5-year age intervals between the ages of 25 and 64, of age- and education level-specific estimates of mean training hours.

Source: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.

BEST COPY AVAILABLE

Table 1.3
Closing the training gap experienced by poorly qualified adults 25-64 years old, 1994-95

A. Change needed in *total volume of training*[1] to increase participation of persons with less than secondary education to the level of those with an upper secondary education (percentage increase)

	Total	Men	Women
Canada	2.9	7.5	1.5
Germany	8.1	5.9	8.7
Ireland	37.1	24.4	50.4
Netherlands	25.2	16.7	32.2
Poland	12.8	15.8	10.9
United Kingdom	12.0	10.7	11.9
United States	7.7	7.2	9.4

B. Change needed in *volume of training provided to persons with less than upper secondary education*[2] to increase their participation to the level of those with an upper secondary education (percentage increase)

	Total	Men	Women
Canada	27.4	85.3	12.4
Germany	69.1	67.3	54.3
Ireland	123.8	83.9	179.9
Netherlands	126.5	97.4	132.8
Poland	109.4	165.8	97.4
United Kingdom	109.2	174.3	67.6
United States	206.8	149.2	361.4

Source: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.

1. Calculated as: $$Y_A = \frac{(X_1 - X_0) * Pop_0}{\sum_{i=0}^{3} (X_i * Pop_i)}$$

2. Calculated as: $$Y_B = \frac{(X_1 - X_0) * Pop_0}{X_0 * Pop_0}$$

Where:

Y_A Percentage change in total volume of training (panel A)

Y_B Percentage change in volume of training provided to persons with less than upper secondary education (panel B)

X_i Mean hours of training over a lifetime by adults having attained education level i

Pop_i Number of adults having attained education level i

i Education attainment levels given by:

0 = below secondary;
1 = upper secondary;
2 = non-university tertiary;
3 = university tertiary.

BEST COPY AVAILABLE

training needed to reach the target would be rather small – less than a 20% increase – in most of the countries for which data are available. However, this is a limited measure of the volume growth needed because it assumes that the training content is the same for "at-risk" adults.

But the content of training appears to differ according to the educational attainment of workers. Less qualified workers participate in activities geared to lower skill levels. They also participate more in basic education programmes and other activities that are not job-related (OECD, 1998*a*, pp. 216-217). So, if authorities aim to expand lifelong learning opportunities for poorly qualified workers, the expansion is more likely to be in forms qualitatively different from the "mainstream" training programme, concentrated in those forms of training that are designed to upgrade the skills of such workers.

From this perspective and estimated relative to the present level of training of poorly qualified adults, the required increase is large. Table 1.3B shows that the volume of more targeted training typically would need to more than double from its present level to meet the target.

Resource requirements for lifelong learning: first approximations

The resource implications of the mandate for lifelong learning depend not just on the *volume* of new learning that will have to be provided, but also on the *cost structure* of new learning activities.

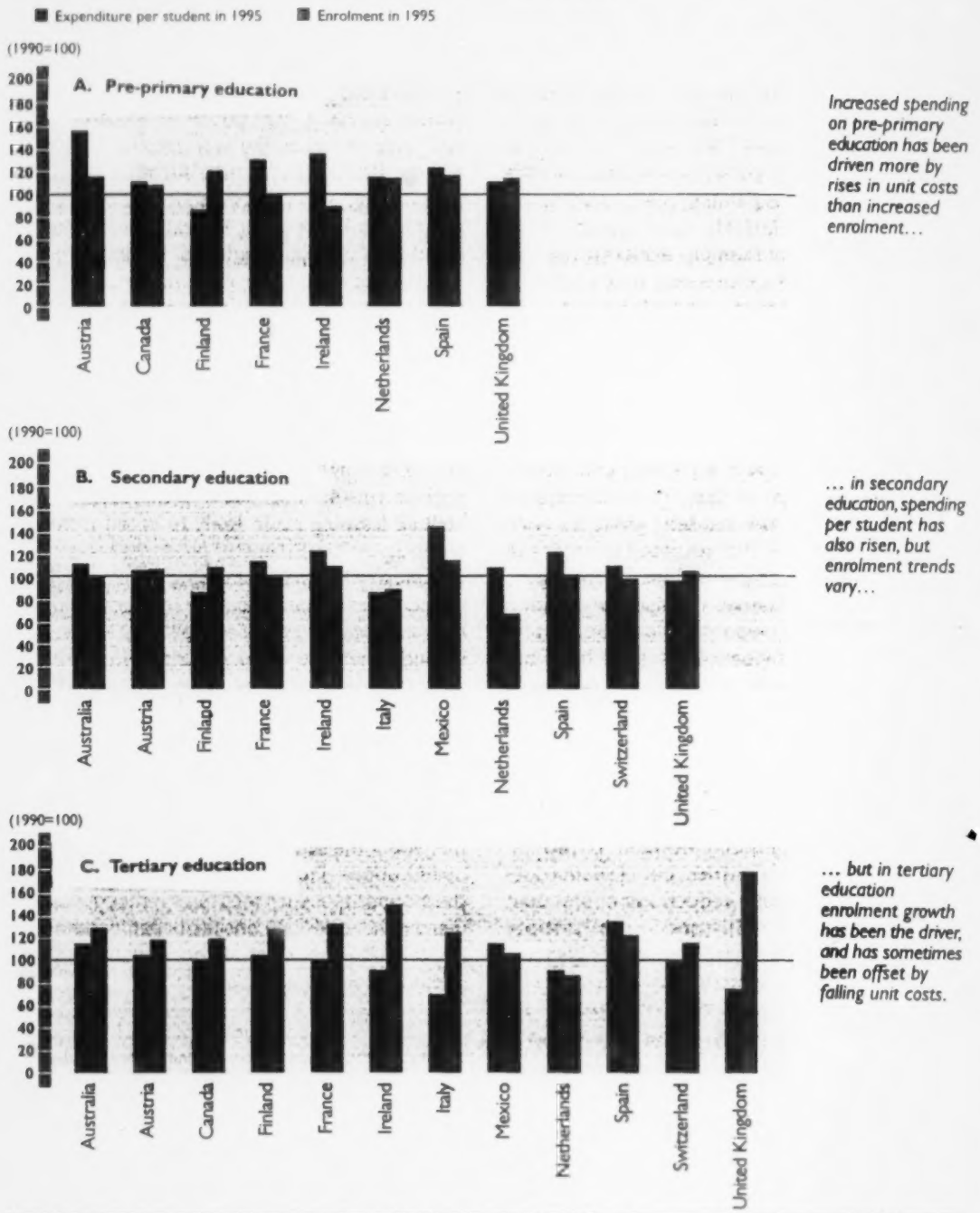
The estimation of costs is difficult for a number of reasons. We do not have data that capture cost functions for existing forms and levels of lifelong learning. The available expenditure data primarily cover provision in public education and training institutions and reflect past practices and funding arrangements. Even where the underlying cost functions are better understood, they do not necessarily provide a basis for estimating future resource requirements for a lifelong learning provision which aims to be qualitatively different in content, context, method, timing and coverage. From this view, the past is not necessarily prologue.

The lifelong learning mandate calls for attention to previously underserved populations, to new demands over a lifetime from all individuals and to "knock-on" effects of improved learning at earlier stages. So, a different mix of provision and different coverage at any given level may be obtained at an average cost which is higher or lower than the previous mix and coverage. On the one hand, there may be greater costs to providing education and training to groups which have been underserved and proven difficult to reach or to meeting learning demands in new, cutting-edge fields such as informatics. Similarly, additional resources may be required to develop and maintain a lifelong learning provision which is sufficiently flexible and diverse to respond to evolving demands and needs. A key cost here will be the continuing professional development and updating of teachers at all levels of education and training. On the other hand, improvements in the early foundations of lifelong learning may well reduce the costs of learning at later stages, such as the costs of failure, repeating and dropping out, or the costs of adult learning when undertaken by individuals who have acquired in foundation learning a motivation and capacity for self-directed learning as adults.

However, as implementation of lifelong learning seems likely to take place within existing institutional arrangements in the formal education sector in the near term recent trends in spending per student provide useful indicators of levels and tendencies in unit costs applied to volume expansion. If the "marginal costs" associated with increasing participation (the unit costs of additional capacity) are high relative to the average unit costs of existing capacity, the resource requirements for implementing lifelong learning can be expected to grow more quickly than participation. Conversely, if marginal costs decline, as they might where innovative new teaching and learning methods are applied or if economies of scale are possible, the resource requirements would grow less rapidly than participation.

Figure 1.4 summarises data on enrolments and per student public expenditures between 1990 and 1995, and provides some indication of the relationship between changes in enrolments and changes in per-student spending.

Figure 1.4
Trends in expenditure per student and enrolment, 1990-95



Increased spending on pre-primary education has been driven more by rises in unit costs than increased enrolment...

... in secondary education, spending per student has also risen, but enrolment trends vary...

... but in tertiary education enrolment growth has been the driver, and has sometimes been offset by falling unit costs.

Source: OECD Education Database.
Data for Figure 1.4, page 88.

BEST COPY AVAILABLE

The data suggest distinctly different patterns for different sectors of formal education. In the pre-primary sector, spending per student increased in all countries except Finland, while enrolments increased at a slower rate or declined. In some countries the differences are considerable. In Austria and France, for example, per-student expenditure rose nearly half again as much as enrolments. If these patterns continue into the future, the costs of expanding pre-primary enrolments will rise relatively more quickly than enrolments. Thus, for example, achieving the 50% increase over 1995 enrolments that would be needed to raise participation rates in Ireland to the *good practice* level (as indicated in Figure 1.2A), would require about a 75% increase in expenditure.

At the secondary level, patterns in the relationship between variations in enrolments and per-student costs are mixed. Increased enrolments were only slightly more likely to be associated with increases in per-student costs as with decreases. Countries that recorded increases in per-student expenditure include those where there have been initiatives to raise participation rates among young persons (Ireland, Spain) and those in which participation rates are high, but declines in enrolments coincide with measures to raise the quality of education for those already being served (Netherlands).[11]

Patterns are mixed at the tertiary level as well. Eleven of twelve countries for which trend data are available experienced enrolment growth. In five of these eleven countries, per-student costs decreased. Yet, despite reductions in unit cost in some countries, full-time initial tertiary education is costly relative to other sectors. Further expansion at the tertiary level could be realised at a lower unit cost, if learners are provided with more opportunities to undertake such studies part-time and at a later age.[12] Adults generally study on a more directed basis and seek to limit the opportunity cost because of financial responsibilities. Whether engaging in tertiary courses, on-the-job training or informal learning, they are keen to ensure that the cost of their studies (often shared or borne fully by themselves) is contained. Thus a tentative conclusion to be drawn is that relative shifts in the age distribution of tertiary education participants could help to reduce the marginal costs of further growth at this level. Such delays will lead to a new life-cycle profile of returns. However, the complementarities among tertiary education, work experience and training at a later stage in adult life may provide additional returns in different forms. All returns can be balanced against reduced costs incurred over a greater number of years. The experience of adults might also provide insights on ways to organise learning options to hold down unit costs of increased tertiary education enrolments of students of traditional university age.

4. THE WILL AND MEANS TO PAY FOR LIFELONG LEARNING

The commonly mentioned configurations of policy goals and institutional arrangements to implement lifelong learning seem likely to entail increased public spending. Estimates produced in Section 3 indicate that the lifelong learning mandate will lead to increases in participation in learning in the formal education sector as well as in non-formal settings. There are strong arguments for the public sector to shoulder the burden of expanding capacity in pre-school and elementary and secondary education, based on the extent of public good of such learning. There also are strong arguments for the public sector to pay for expanded learning opportunities for those who are at risk in the labour market because of low levels of initial qualifications. Public finance can be justified on the grounds that such measures reduce economic dependency and compensate for earlier schooling policy that gave fewer chances than are being offered to today's young people.

11. Of the three countries with declines in enrolments, two experienced decreases in per-student expenditure and one experienced an increase. Increased spending per student when rolls are falling may result from deliberate decisions to improve quality or from the difficulty in trimming committed spending on teachers and buildings in proportion to the drop in student numbers. Conversely, economies of scale may permit increases in enrolment at low marginal cost.

12. Patterns and options for adults are discussed in Chapter 4.

Given the constraints on public resources, implementing the lifelong learning mandate will impose a financial burden on the private sector as well. Aside from the need to do so if expansion of learning is to be realised, there appear to be sound arguments based on efficiency grounds for private finance of expanded learning opportunities. Evidence on rates of return and the relationship between educational attainment and earnings suggest that for most OECD countries tertiary education investments generate substantial private returns for individuals.[13] This would justify increasing students' and households' shares of financing in some countries. This presents a considerable policy challenge, not least in those countries which have relied on public funding for this stage of learning. In these and other countries, increased student contributions need to be accompanied by forms of targeted financial support to ensure that those who lack resources or are otherwise hesitant are not discouraged from participation. Examples of policies which incorporate these protections are means-tested tuition fees in the United Kingdom; income-contingent student loans or deferred charges in New Zealand, the United Kingdom, Scandinavian countries and Australia; and need-based financial aid in the United States.[14] Data on earnings gains and rates of return to enterprise-based training and other adult learning activities are less extensive. However, the preponderance of evidence suggests that employers enjoy substantial gains in terms of increased productivity, and individuals in terms of higher wages, and reduced risk of unemployment (OECD, 1997*a*). This too would argue for substantial investment on the part of employers and individuals to pay direct and indirect costs of adult education and training.

So, implementing the mandate for lifelong learning is likely to require, in the short and medium term, higher levels of private investment in various forms of tertiary and adult learning for which there are substantial private returns. On the basis of ongoing work, it appears that in order for this to happen, two policy goals would need to be pursued.

The first policy goal is to increase the *incentives* for employers, individuals, and households to increase investment in lifelong learning. In other words, regardless of whether returns to such learning can be observed directly, actions to raise the rates of return will enhance the incentives to invest. This might be accomplished, for example, through diverse strategies that increase the visibility of learning outcomes, and the predictability of consequences for wages as well as strategies for reducing the costs, such as the time required for training. Returns can be raised (benefits increased and/or costs reduced) if the likelihood of success in learning is improved through changes in programmes, teaching and learning which reduce drop-out and failure and allow continuous progress toward an identified learning objective. Whatever method of financing, higher contributions from students will need to be accompanied by measures to support those who might be discouraged from participating owing to new or higher fees or unfamiliar lending arrangements.

The second policy goal is to provide the *enabling mechanisms* that allow learners, employers and other third parties to act on those incentives. This depends on putting in place mechanisms to facilitate the financing of the costs of current learning out of future earnings and/or savings, or by other means to reduce the up-front cost of financing lifelong learning.

Box 1.2 presents examples of policies which reflect to a greater or lesser extent, these goals.

5. CONCLUSIONS

The preceding analysis suggests that if the lifelong learning mandate is to serve as a meaningful map for policy makers, it is likely to require more resources at least in the short and medium term. The challenge of meeting the resource requirements is complex because the mandate changes so many parameters at once. Three of those parameters have been examined in this chapter: the volume of learning, the unit costs of learning, and who pays for learning.

13. For example, OECD (1998*a* and 1998*c*). The returns to individuals are assessed after taking into account tax payments.

14. See e.g. OECD (1998*b* and 1998*d*) and EURYDICE (1999) for more information on tertiary education financing approaches and country experience.

BOX 1.2 STRENGTHENING THE INCENTIVES AND MEANS FOR INVESTING IN LIFELONG LEARNING

If lifelong learning cannot be paid for entirely by public authorities within the framework of existing institutional arrangements, employers and individuals will have to provide some of the resources. Strengthening incentives to invest in lifelong learning depends on raising rates of return; this, in turn, depends on increasing benefits and/or reducing costs of learning opportunities. The question for policy makers is how to ensure that employers and individuals have the *incentives* and *means* for doing so. The OECD Secretariat, in co-operation with eleven Member countries, undertook a study to examine this question. Some of the options are:

• *Reducing teaching and personnel costs*. Compensation of teachers and other educational staff are the single biggest component of costs in the formal education system – on average, 82% of all current expenditure at the elementary and secondary levels, and somewhat lower at the tertiary level. One way of controlling cost increases with expanded enrolments is by allowing increases in average class size, where this appears to be consistent with required quality. Hungary, Italy and Sweden all reported doing this. In Austria there has been a reduction in in-service training during school hours; authorities in the Netherlands are attempting to reduce absences for illness and disability.

• *Better co-ordination and rationalisation of education provision*. A majority of eleven countries aim to improve the quality and cost-effectiveness of lifelong learning by improving co-ordination between providers, and rationalising services by individual providers. So far these efforts are most visible on the public side. Austria, Italy, and the Netherlands all have established bodies to co-ordinate adult education and training activities, at a regional level in the case of the latter two. In the Netherlands, the Regional Education Centres (ROCs) depend on the Ministry of Education, but have considerable autonomy in which services they co-ordinate. The Italian "Formazione Tecnico-professionale Superiore" relies on a consortium of education and training providers and enterprises, and resources from the European Union, various levels of government and private resources.

• *Establishment of qualifications frameworks*. Austria, Denmark, Hungary, Italy, the Netherlands, and Norway are at different stages of developing qualifications frameworks to be used for the assessment and recognition of learning outcomes from the workplace and other non-formal settings, as well as formal education settings. The purpose of such frameworks is to provide a means for ensuring continuity in the learning process, as individuals move between formal and non-formal settings, and visibility of the learning outcomes. The underlying rationale is that this increases the efficiency of learning (by minimising re-learning), and increases its benefits (by making learning outcomes more portable). Although formal education systems in some countries have considerable experience with accreditation of work and life experience through "assessment of prior learning", there has been much less progress in developing systems that effectively signal learning outcomes that are relevant to the workplace.

• *Encouraging competition among providers*. Some countries encourage the growth of education and training "markets" as a way of increasing diversity of providers and increasing the competitive pressure to improve quality and reduce costs. Through greater use of information and communications technology (ICT), for example, Japan has relied on outside providers in all sectors of education; the expansion of tertiary education participation has been possible only because of the growth of non-public institutions. The Czech Republic and Hungary encourage the establishment of private universities to expand tertiary opportunities, and introduce

competitive pressures to improve the cost-effectiveness of tertiary education. The Danish Ministry of Labour relies entirely on outside providers, ranging from adult education provided by the Ministry of Education, to technical/commercial colleges to business schools.

• *Reducing costs and increasing flexibility* through information and communications technology (ICT). ICT is seen increasingly as a means for making high-quality, low-cost learning opportunities more widely available. In Japan and Korea, open universities (University of the Air in Japan, and the Korean National Open University) rely heavily on correspondence, satellite and cable networks, video conferencing, and television broadcast to reach a broad spectrum of adults interesting in pursuing tertiary studies on a part-time, non-residential basis. In Norway, tertiary institutions are now linked through an electronic infrastructure that uses videos and computers in the lecture halls to make courses accessible to students in remote locations and at variable hours. The pulp and paper industry in Sweden has established a co-operative programme with public officials and employees to offer ICT-based instruction at hours and locations that are convenient to workers and minimise time lost from production.

Even if lifelong learning can be proven to generate future additional benefits that substantially exceed the additional costs, there remains a question of how individuals, employers, or governments can pay the up-front direct costs of tuition or expanded capacity, or the indirect costs of foregone production, earnings, or tax revenues. In the case of expansion of formal education, particularly at or below the secondary level, the answer depends very much on public budget decisions. The answers are more open-ended with regard to the finance of volume growth in tertiary education, and even less clear with regard to finance of learning by adults.

Learning that occurs outside the workplace often is paid for by public authorities, typically by municipal authorities (Japan, Norway, Sweden); in some countries individuals may pay small fees. In Denmark and the Netherlands funding is linked in part to outcomes, such as successful completion. Austria, Denmark, Italy, Norway and the Netherlands provide training leave for training that is initiated by individuals or employers. In addition, Denmark, Italy, Netherlands and Sweden provide some subsidies for employer training. Fiscal and para-fiscal measures to facilitate private financing of training are more limited and varied. Italy, Korea, and the Netherlands have levies requiring employers to pay for training, or to pay a tax. In Italy and the Netherlands certain learning costs are tax deductible for individuals. For the most part, though, there are no special measures aimed to spur net new private resources for training. In none of the countries studied are there provisions to encourage either employers or individuals to treat training costs as investment instead of consumption or current operating costs. Nor are there provisions to address the financing difficulties that arise because of the differences between the tax and accounting treatment of investment in lifelong learning, and investment in physical capital.

Different scenarios may be identified for operationalising the lifelong learning mandate. Those examined in this chapter reflect the recurring themes in the *current* discussion and debate on lifelong learning, and they are stated in terms of existing institutional arrangements rather than entirely new ideas and structures. Decision-makers may opt for different, more ambitious, more differentiated goals and objectives. But it is precisely the possibility of setting and fine-tuning different parameters simultaneously and the interdependence among those parameters that create opportunities for innovative policy solutions.

Thus, policy actions may be needed in three areas. *First*, policies will need to foster expanding participation in a range of learning activities. Some of the growth will take the form of increased

capacity in formal education systems (or at least higher participation rates where demographic changes lead to declines in the size of particular age groups). A sound foundation for lifelong learning depends on near-universal completion of upper secondary, as well as expanded participation in early childhood and tertiary education. Further, there is a need for expanded participation by adults in various forms of learning over the lifecycle. The scenarios examined in this chapter provide a frame of reference for evaluating options for growth at these stages of lifelong learning, in comparison to current practice within a country and in comparison to current practice internationally. Current OECD thematic reviews of early childhood education and care and of adult learning will provide additional evidence on the extent to which increases in participation at one stage may lead to decreases or increases in participation at a later stage.

Second, policies will need to address the costs of increased provision. Ambitious increases in participation in lifelong learning may be achievable only if the marginal costs of expanded capacity are kept low. Unfortunately, data on direct average and marginal costs of learning in formal education systems as well as adult learning and knowledge of underlying cost functions are limited. However the chapter provides a basis for sharpening the policy questions and evaluating approaches now in place to limit the costs of provision. Current OECD work aims to identify the impacts of qualitative changes in learning opportunities on their costs, and the links between qualitative improvements at one stage of lifelong learning on costs of learning at a later stage.

Third, the resource challenges posed by the lifelong learning mandate can be addressed by shifting the burden of who pays. Constraints on public resources combined with the presence of substantial private returns to certain stages and types of lifelong learning call for a mixed finance strategy with more private source funding. Policies need to improve the *incentives* for employers, individuals, and households to increase investment in lifelong learning, and to provide the *means* that allow them to respond to those incentives. These issues are currently being explored in the OECD work on financing lifelong learning ■

References

COMMUNAUTÉS EUROPÉENNES (1999), *Formation continue en entreprise. Faits et chiffres*, Office des publications officielles des Communautés européennes, Luxembourg.

EURYDICE (1999), *Key Topics in Education: Financial Support for Students in Higher Education in Europe – Trends and Debates*, Luxembourg.

OECD (1996), *Lifelong Learning for All*, Paris.

OECD (1997*a*), "Lifelong Learning for Employability", free document, Paris.

OECD (1997*b*), *Manual for Better Training Statistics*, Paris.

OECD (1998*a*), *Education at a Glance*: OECD Indicators 1998, Paris.

OECD (1998*b*), *Education Policy Analysis* 1998, Paris.

OECD (1998*c*), *Human Capital Investment: An International Perspective*, Paris.

OECD (1998*d*), *Redefining Tertiary Education*, Paris.

OECD (1999), *Employment Outlook*, Paris.

OECD and **STATISTICS CANADA** (1995), *Literacy, Economy and Society. Results of the First International Adult Literacy Survey*, Paris and Ottowa.

OECD and **HUMAN RESOURCES DEVELOPMENT CANADA** (1997), *Literacy Skills for the Knowledge Society. Further Results of the International Adult Literacy Survey*, Paris.

CHAPTER 2

EARLY CHILDHOOD EDUCATION AND CARE:
Getting the most from the investment

Summary

OECD countries are becoming convinced of the importance of provision for young children, both as a first investment in lifelong learning and as a support to the wider economic and social needs of families. Yet participation in early childhood education and care (ECEC) varies in different countries. In developing such services, countries are looking not just at the general case for ECEC but at how to organise and deliver it to get the best results.

Overall benefits remain imperfectly understood. Research shows a strong initial effect, for example on school readiness, particularly for disadvantaged children. But direct gains, for example in IQ, appear to fade. Yet some durable improvements in general traits such as self-confidence can in turn feed back into cognitive as well as social benefits. There are also discernible advantages for family relationships.

Claims about very long-term benefits to society and to individuals derive from relatively few studies of particular programmes, and such gains may depend on specific programme features. But this underscores a general conclusion that results do vary with programme quality. ECEC investment is not homogeneous, yielding a constant return.

In shaping ECEC investment, countries face a spectrum of policy choices, and have developed a wide range of systems that vary along several dimensions:

- Countries provide wider or narrower *access*, according to whether they regard ECEC as a general right or as a targeted, compensatory measure. So in some countries access is universal by age 3; in others the majority do not participate until 5 or 6. For children under 3, access is far more limited everywhere.
- The *quality* of ECEC is hard to measure, but is linked to the intensity and focus of programmes and to the qualifications of staff. The training and professionalism of those working with young children varies widely across countries and sectors.
- *Who pays* for ECEC varies from mainly public funding in EU countries to mainly private in Canada and the United States. It is generally accepted, however, that funding should be mixed: the state has at least a duty to ensure access for the most needy, while the role of private resources to enhance provision cannot be neglected.
- Arrangements for *administering* ECEC vary from a traditional split between education and health/social authorities to more unified arrangements being adopted in several countries.
- The degree to which governments help families to *reconcile work and childcare* is not just a matter of out-of-home care provision, but also of helping parents look after their own children, for example through leave arrangements. In Europe, these two types of support are coming to be seen as complementary.

The OECD thematic review of early childhood education and care is currently looking into how policies in this field can not only improve young children's social development and learning but also better link to family, labour market, social integration and lifelong learning policies.

"It can be argued that the comparative neglect of this important subject [investing in early childhood] may be, to a great extent, the result of taking a limited – and rather ad hoc – view of the quality and implications of childhood."

Amartya Sen, Nobel Prize winner in economics in 1998.

1. INTRODUCTION

The education and care of young children has received growing policy attention in OECD countries in this decade. Interest has been fuelled by research showing the importance of positive early experiences for the child's subsequent development and learning. In addition, new labour market conditions, with women participating in the labour market in far higher numbers than ever before, has led to an increased demand for early childhood services. There is growing consensus that sound provision for young children is essential to meeting the changing social, economic and educational needs of today's families. The emphasis of the policy debate is no longer on whether to invest in early childhood education and care (ECEC), but how best to organise and deliver high-quality ECEC services.

Despite the consensus about the need, investment in education and care programmes for young children remains highly uneven among OECD countries. Figure 2.1 illustrates the wide level of variation with respect to one indicator: the average amount of time spent in educational programmes by the age of 6.[1] Children in some countries can expect to have spent four years in centre-based pre-school or in primary education by this age; in others the average is only one year.[2] These differences relate partly to the importance of education within programmes, and partly to variations in overall resources devoted to them.

This chapter presents, first, evidence on the benefits of early childhood education and care and second, the ways in which policy is developing in this area. A central message is that early childhood education covers a broad range of provision (see Box 2.1). As defined for this chapter, early childhood education and care includes all organised provision for children below compulsory school age, whether education- or care-oriented, part-day or full-day, centre-based or home-based. The chapter also refers to the role of informal education and care by families, relatives and others. Both in analysing evidence of benefits and in shaping future policy, distinctions need to be made between different types of provision and different ways in which it can be organised.

2. WHAT DOES RESEARCH TELL US ABOUT THE CASE FOR EARLY INTERVENTION?

International research has produced a consensus over the immediate benefits of early childhood education and care (ECEC) for children. Evidence of wider-reaching benefits to young people over the long term, to their families and to society is highly suggestive, but less clear-cut. Rather than assuming that all ECEC investment brings equal benefits, policy makers need to evaluate the impact of different types of programmes.

The research base is substantial, but not without weaknesses in methodology and coverage of both the range of provision and the comparative experience.[3] The studies identified here are based on experimental research designs or make comparisons between ECEC participants and non-participants with similar backgrounds. They provide an indication of the range of findings and conclusions.

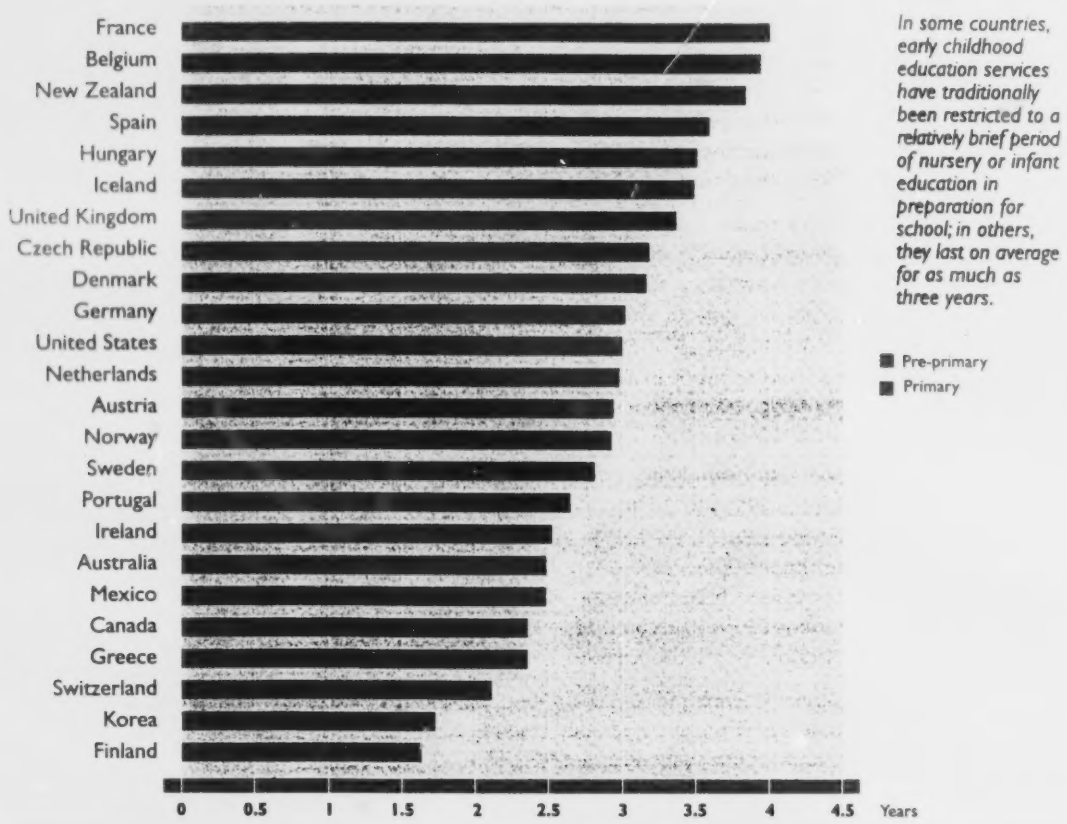
1. Pre-school programmes for which data are available in the OECD education database cover a part, if a growing part, of organised ECEC. But ECEC participation and provision encompasses a much wider field. In the Netherlands, for example, around half of all 3-year-olds attend playgroups for at least two mornings or afternoons each week, and children at this age or younger increasingly are in daycare programmes. The numbers engaged in these activities or programmes are not included in the comparative data. At the same time, the distinction between early childhood education and primary schooling is less clear. Dutch policy has brought provision for 4-year-olds into the basic school, which now covers ages 4 to 12. Dutch policy favours such diversity in provision. See Box 2.1.

2. The available data do not yet reflect more recent rapid growth in provision and participation. In Portugal, for example, the participation of 3 to 5-year-olds increased by 25% in three years ending in 1997 (and the participation rate by nearly 9%). The overall participation now represents over 60% of the age group. See *Ministério da Educação* (1999).

3. For example, many studies do not use control groups with family background and cognitive characteristics comparable to those of the programme or experiment participants. This applies both to studies which find positive effects as well as to those which find weak or no effects.

BEST COPY AVAILABLE

Figure 2.1
Educational expectancy of children aged 3 to 6, 1996
Average number in years in pre-primary[1] and primary education (based on headcounts)



In some countries, early childhood education services have traditionally been restricted to a relatively brief period of nursery or infant education in preparation for school; in others, they last on average for as much as three years.

1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).

Source: OECD Education Database.
Data for Figure 2.1, page 89

Benefits to children

The importance of early development: Neuroscientists and psychologists in OECD countries agree that the first years of life are critical for cognitive, physical, social and emotional development.[4] Children's brains have a remarkable ability to change (and compensate for problems) in the first few years of life (Carnegie Task Force on Meeting the Needs of Young Children, 1994; Education Commission of the States, 1996; Shore, 1997). It is during the earliest years that future capacity to participate positively in learning and adult life is relatively "hard-wired" (Lambert, 1996; Lindsey, 1998). If opportunities to promote children's development and learning are missed in this period, later remediation is more expensive and less effective (Shore, 1997).

4. Findings of studies carried out in countries outside the OECD area are broadly similar. Early childhood programming has been shown to improve survival chances and healthy development of young children in such countries as Bolivia, Brazil, Guatemala, India, Indonesia, Jamaica, Malawi and Thailand. See van der Gaag and Tan (1996).

BEST COPY AVAILABLE

BOX 2.1 EARLY CHILDHOOD EDUCATION AND CARE: EVOLUTION AND DEFINITION

Traditionally, ECEC has been seen as the relatively brief period of nursery or infant school, immediately before entry into primary school, sometimes with a more specific focus on disadvantaged children. In the more affluent parts of society, children up to the age of 4 or 5 remained with the family. This choice suited a widespread model of family organisation, in which married women stayed at home to raise infants and young children. Extended family and neighbours provided, when necessary, alternative informal care arrangements. At the age of 4 or 5, children were sent to part-day nursery or infant classes, either privately run or joined to the local elementary school.

Two factors caused a move away from providing early childhood education and care either along the lines of the primary school or with a focus on disadvantaged children. One was changing social and economic conditions and a rise in women's employment rates, which increased the demand for extra-familial care of children from the very early years for a much wider share of families. The other was research showing that the "academic" approach of the traditional pre-school – with child/teacher ratios approaching, sometimes exceeding those of primary school – was too narrow in range and unsuited to the broader developmental and social needs of many young children and their families.

As a result, a number of countries began to establish integrated care and education systems, which included infants and toddlers and aimed at broader social and developmental goals. Settings in these systems offered a safe, secure and health-promoting environment for the youngest children and organised learning activities to prepare older children for entry into primary school. School-type pedagogy was avoided, with more emphasis placed on interaction, play and creative activities for children. The early centres became also places for socialisation, parent participation and community orientation.

The evolving influences, trends and developments have combined to give rise to a wide array of activities aimed at young children, organised outside the family but sometimes with parents very much involved. Excluding family and informal care, ECEC under varying definitions may cover: *daycare* which primarily looks after children during normal working hours, through centre-based nurseries, both public and private; *childminders/ family daycare*, who look after young and older children, before and after school, under official or private auspices at the childminder's or the child's home; *playgroups*, usually for children of age 2 or 3; *parenting and home-instruction programmes* which are organised regularly and intensively, with educational and development aims in mind; *centre-based pre-school*, either kindergarten or nursery education classes organised either during the school year or (less frequently) over the entire year, in separate sites or attached to primary schools. Children often participate in more than one type of ECEC programme during the course of the same week or day.

Although this breadth of provision conveys the reality of ECEC in most OECD countries, the data collected for international comparisons refer primarily only to pre-primary education, defined as participation in organised, centre-based programmes designed to foster learning and emotional and social development in children from 3 years to compulsory school age. The comparative data presented in this chapter therefore provide only a partial picture of ECEC as they do not include all forms of such services or coverage for very young children.

Policy attention is now directed in greater measure to more intensive and purposeful types of ECEC, that is, to programmes organised with sufficient regularity in centres and homes with clear developmental and educational aims in view. These types of ECEC, extending beyond pre-primary education, are considered in the research and policy choices analysed in this chapter.

Table 2.1 reviews the results of some of the major research that has looked for positive benefits of early childhood education and care to young people. It is clear from a range of studies that discernible benefits do exist.

A consensus over short-term benefits of ECEC: ECEC programmes produce important immediate and short-term impacts, which affect children's school readiness and other outcomes in the year or two (or more) after they leave the programmes. One of the clearest illustrations comes from France, where children's chance of having to repeat the first grade of elementary school is reduced with each year of attendance of the *école maternelle*, from one to three years. This result applies for all children but is particularly strong for those from disadvantaged homes (Jarousse, Mingat and Richard, 1992).

Mixed evidence on longer-term benefits: Less clear is the extent to which ECEC programmes produce long-term effects – usually measured three years after leaving the programme – on cognitive development, socialisation and school success. Some studies appear to show that benefits fade over time. For example, participants in America's Head Start programme appear to lose some cognitive advantages by the end of the second year of school, and social and motivational ones by the end of the third year (McKey *et al.*, 1985). Yet while most studies do not provide evidence that participation in Head Start raises IQ significantly for long periods of time, longitudinal evaluations have shown sustained improvements in other performance measures such as reading ability and retention in grade (Lazar *et al.*, 1982; Gomby *et al.*, 1995). Moreover, research on school failure shows that early gains can be more widely translated into improved school performance in subsequent years when young people in primary and secondary schools encounter programmes, teaching and environments which are of high quality and responsive to their individual circumstances and needs (OECD, 1995, 1998c; UNESCO, 1998).[5]

Further, a recent U.S. review of 36 studies supports earlier findings that ECEC can produce long-term cognitive and academic benefits for children from disadvantaged backgrounds (Barnett, 1995). These benefits were found in a wide range of different types of programme and across a number of different groups of children. In most cases, these cognitive gains during the early childhood years were sustained until school entry, and there was some evidence of persistence into adolescence. The evidence that participation in ECEC is linked to high school graduation and lower delinquency rates is strong, but it is based on the relatively small number of studies that have tracked young people for a sufficiently long period (*op. cit.*). An even longer-term effect is identified by a study of the Perry Preschool Project, which followed participants over three decades. At the age of 27, the children from disadvantaged homes who had taken part were found to have completed a significantly higher level of schooling, produced fewer non-marital births and had higher average earnings when compared to the experiences of similarly disadvantaged children who had not participated in the programme (Schweinhart *et al.*, 1993).

The importance of programme quality: Although different ECEC programmes produce different outcomes, studies uniformly show that the quality of provision has an important impact on children's development from the earliest stages: young children who receive high quality care, attention and stimulation in the first three years of life are likely to demonstrate better cognitive and language abilities and experience more positive mother-child and social interactions than children in arrangements of lower quality (NICHD, 1997). Children in low quality programmes are likely to have difficulties with language, social and behavioural development (Whitebook, Howes and Phillips, 1989). Moreover, benefits for children are less likely to "fade out" in well-designed, intensive forms of early childhood education and care than those designed merely for "custodial" purposes (Barnett, 1995).

5. This research partly explains the apparent anomaly of relatively high failure and youth unemployment rates in some countries where early childhood education and care provision is extensive. Ineffective educational practices beyond the early years affect the scale and nature of the longer term learning gains arising from participation in ECEC. These practices and their educational consequences, along with labour market conditions and features which make the transition from initial education to work more difficult for young people, may be more important in accounting for high youth unemployment in these countries.

Table 2.1
Studies that have looked for benefits from ECEC

Author	Country	What the study looked at: Type of programme	What the study looked at: Purpose of study	Key findings
Programmes for disadvantaged children				✓ benefit ✗ no or weak measurable benefit
Braithewaite (1983)	Australia	One year of pre-school (different models) for children in low income public housing	To assess impact of pre-school on performance in 1st grade	✓ Performed better than control group on entry into 1st grade ✗ No measurable effects by end of 1st grade
McKey *et al.* (1985)	USA	Meta-analysis of Head-Start studies. Head-Start offers comprehensive development services for low-income 4-year-olds to meet their educational, health, nutritional and psychological needs. Community and parent participation are emphasised	To assess long-term effects of Head-Start	✗ Cognitive gains and school achievement faded by the end of the second year of school ✗ Initial positive effects on self-esteem, motivation, and social behaviour were no longer apparent by the end of the third year in school.
Kellaghan and Greaney (1993)	Ireland	Two years of half-day pre-school for ninety children aged 3 from an impoverished area of Dublin, with home visits to parents by teachers and social workers. Study began in 1969	To measure school achievement and parental involvement at ages 5, 8 and 16 years	✓ Significant improvements on standardised tests at age 5, especially among the least able children ✗ Cognitive gains were not maintained at age 8 ✓ But at 16 years, the pre-school children were two to three times more likely to have taken examinations leading to further education ✗ Few impacts on employment or crime
Lazar *et al.* (1982)	USA	Eleven pre-school programmes	To measure school achievement	✓ Less retention in grade ✓ Fewer special placements
Berrueta-Clement *et al.* (1984)	USA	High quality education for low-income African-American children, aged 3-6 years (Perry Pre-school)	Educational and social effects at age 19	✓ Improved school performance ✓ Greater labour market entry ✓ Less trouble with police ✓ Less teenage pregnancy
Schweinhart *et al.* (1993)	USA	High quality education for low-income African-American children aged 3-6 (Perry Pre-school)	Educational and social effects at age 27	✓ Greater social responsibility ✓ Higher earnings, economic status ✓ Greater commitment to marriage
Programmes for all children				
Jarousse *et al.* (1992)	France	Participation in *école maternelle* (French pre-school) for one, two or three years. Children aged 3 to 5 years.	To assess effects on primary school performance	✓ Children who attended the *école maternelle* were much less likely to have to repeat 1st grade. ✓ School performance better for every extra year of pre-school.
Osborn and Milbank (1987)	UK	Any early childhood programme compared to none	To measure effects on educational and social outcomes at ages 5 and 10	✓ Improved cognitive and school achievement at both ages, especially of disadvantaged children. ✗ No measured impact on socio-emotional development
Programmes for children and mothers				
Kagitcibasi *et al.* (1986 and 1991)	Turkey	Home visiting and group programme aiming at the education of mothers with young children in low income families.	To measure subsequent development and school achievement of young children	✓ Mothers more verbal, less punitive, more supportive of the education of their children. ✓ Children improved IQ, social and personality development

All studies, except McKey *et al.* (1985), follow an experimental research design that includes control groups. See Barnett (1995)

BEST COPY AVAILABLE

The importance of family influences. The benefits to be gained from quality provision outside the home need to be seen in tandem with the continuing importance of experiences within it. In the British Child Health and Education Study, no other factor including socio-economic status influenced school outcomes as consistently as having a stable, developmental home life, supported by participation in a high quality pre-school programme. An evaluation of a home-visiting programme in Turkey, aimed at assisting mothers rear and support the development of their children, confirms these findings. Young children coming under the programme scored higher on experimental tests administered in the early years and demonstrated improved performance in primary schooling (Kagitcibasi and Bekman, 1991).

Overall, the findings of the studies show that young children who participate in a quality ECEC environment are likely to develop reasoning and problem-solving skills, to be more co-operative and considerate of others, and to develop greater self-esteem. Even if their IQ advantage fades, many of these positive effects may linger and contribute to children's positive classroom learning behaviour, motivation, and academic achievement. Such positive effects have been found both in countries like France where the early childhood education and care system is quite uniform (for children over 3) and in countries such as Germany and Britain where early childhood interventions are more varied. So, in partnership with parents and quality primary and secondary schooling, ECEC has the potential to maximise children's motivation and preparation as they begin a lifetime of learning (OECD, 1996*a*).

Benefits to families

Recent demographic and labour market changes have created a situation in which there is growing need and demand for the care of young children whose parents are working. The demand has been further driven in some countries by welfare-to-work programmes that try to make more single parents economically self-sufficient. The relationship between working patterns and childcare opportunities may work from the supply side, too. A cross-national analysis (Gustafsson and Stafford, 1995) shows that provision of ECEC promotes maternal employment by making it easier for mothers to find and hold jobs. In general, quality ECEC arrangements that are reliable and accommodating of varied employment schedules have been found to facilitate worker attendance and performance (Shinn, Galinsky and Gulcur, 1990).[6]

Early childhood education and care services can also promote lifelong learning and other positive outcomes for parents and family members. Research in New Zealand has found that benefits of ECEC for parents include enhanced relationships with their children, alleviation of maternal stress, upgrading of education or training credentials, and improved employment status (Wylie, 1994). Early childhood settings can provide links to parenting education, continuing education and adult literacy and other services to meet the needs of parents who may resume their own education or develop new creative or social interests (OECD, 1996*b*, 1998*a*). In addition, in neighbourhoods with few community or extended family supports or in labour markets with a high degree of worker mobility, ECEC programmes can provide parents and families with opportunities to develop social support networks and ties with other families (OECD, 1995).[7]

6. Notwithstanding the demonstrated positive effects for mother and child alike, uneven and limited access to affordable, high quality, organised ECEC provision which is responsive to the varied work arrangements available means that many parents face poor second-best choices: forego working, choose jobs which allow family responsibilities to be met but do not allow full use of their skills and knowledge or rely on poor quality ECEC programmes and informal arrangements. See Bertelsen (1991), Kloprogge (1998), Galinsky *et al.* (1994), NICHD (1997), Leibowitz *et al.* (1992).

7. In studies of experiences in countries outside the OECD area, early childhood initiatives have been found to set in motion follow-up programmes for children in primary schools as well as adult literacy programmes for women and community health projects. See van der Gaag and Tan (1996).

Benefits to society

The research reviewed above shows that ECEC can help children perform better at school, can make them more likely to grow up to be more responsible citizens and can give their parents greater opportunities to participate in the labour market. All these benefits are socially desirable in themselves. High quality, flexible and affordable ECEC influences tax contributions and welfare payments in the near term by enabling parents to become and to remain employed. It can motivate a wide variety of community members – women's associations, fathers, teachers, volunteers, fund-raisers – to work together with the goal of meeting the needs of young children and their families. It can also provide parallel services to community members or act as a hub for referrals. In such ways, ECEC can strengthen social cohesion and social support.

Social gains require, however, an investment of resources, both public and private. The limited data available suggest great variation in the scale of that investment. Resources allocated to centre-based early childhood (pre-primary) education activities range from 0.1% of GDP or less in Korea, Portugal, Turkey and the United Kingdom to more than 0.6% of GDP in Denmark, Finland, France, the Czech Republic and Hungary. The differences are mainly attributable to the scale of participation. Country differences in spending for ECEC may also be explained by the levels of private resources made available for such activities and the types of expenditures included. In Australia, for example, an estimated 0.1% of GDP is spent on pre-schools. If centre-based childcare is included, expenditures represent an estimated 0.3% of GDP.

Studies that evaluate the benefits against the investment costs are limited.[8] Even though there are relatively few analyses which provide evidence in financial terms of the extent to which the benefits recoup investment costs, the research reviewed above confirms the scale and nature of those benefits and suggests the kinds of complementary initiatives which can sustain and enhance them. Most specifically, social as well as private benefits for the children concerned depend to a great extent on programme quality and complementary initiatives that build up parental and community support for the social development and learning of children in the early years. Likewise, sustained educational gains depend on active, organised, supportive learning opportunities and environments in primary and secondary schools.

3 WHAT ARE THE MAJOR POLICY DIMENSIONS IN EARLY CHILDHOOD EDUCATION AND CARE?

Because governments in all OECD countries play a more active role in organising or encouraging the provision of early childhood education and care, they face decisions about how best to implement policy and practice. These decisions are not easy, given the complexity and changing nature of relationships between families, children and their development and learning, and the state.

An underlying issue is the demarcation between public and private responsibility for looking after and meeting the needs of young children. The recent acceptance in most countries of the need for a more direct state concern for young children owes much to the changing role of women in the workforce and to the recognition of the benefits of ECEC to children and society described in the above research review. ECEC has also been recognised as a key tool for social justice and equality of opportunity: it is widely agreed that young children should not be obliged to suffer

8. Verry (1998) sets out the economic dimensions of early childhood education and care. For assessments of benefits evaluated in monetary terms and costs of ECEC programmes, see, e.g., Berrueta-Clement *et al.* (1984), including the commentary by Gramlich, see also Schweinhart (1993). These studies rely primarily on information collected from specific programmes or, on the other hand, embrace a wide variety of programme arrangements and qualities, so the findings are either not easily generalised or not as useful in identifying the most effective and efficient ways to organise ECEC. Studies tend to focus on a sub-set of benefits which more or less correspond to the principal objectives of types of ECEC provision under review, e.g. associated gains in achievement, health, citizenship, educational attainment and employment (sometimes reduced social welfare costs) or associated differences in labour force participation of mothers (and the related financial consequences on public accounts and in family budgets), e.g. Ribar (1995), Leibowitz *et al.* (1992), Gustafsson and Stafford (1995), but not the full range of benefits.

the consequences of early disadvantage. Whether they interpret the principle of equity as meaning that programmes should be targeted on disadvantaged groups, or seek rather to provide a common standard of early childhood learning for all, most countries now see ECEC as a national responsibility and an essential part of the social infrastructure.

Where countries differ, however, is in their interpretation of the respective roles of families, government, employers, private and voluntary bodies in initiating, funding, organising and monitoring such programmes. Neither state neglect of the young child sector nor state monopoly of service provision is seen today as an ideal solution in terms of child development, financing, social participation and outreach. Further, early childhood services are seen not as substituting for families, but as partners with them. This is true, in particular, of care for the under-threes which in general is based on family care, supported by fiscal benefits and by paid and job-protected parent leave following child-birth.

However, there is no dominant ECEC "model" in OECD countries, in terms of who has access to what, who pays for it, how it is administered and how it interacts with parents' commitments to family and to work. Each of these aspects represents a dimension of early childhood education and care policy which is analysed below.

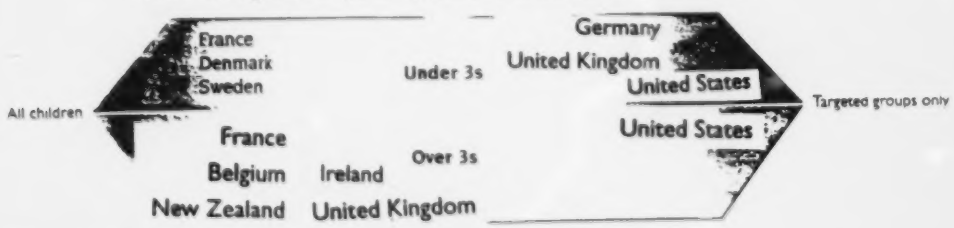
a) Access for whom? Access to what?

Access to early childhood services is wider or narrower across countries according to whether it is considered a right or a privilege. In general, the Western European continental countries view early childhood education for the age group 3-6 years as the right of every child. They see the opportunity to benefit from early education as a matter of equality of opportunity. In many OECD European countries, the trend is to provide free, universal coverage for children within the public school system for a substantial period prior to compulsory education (for as long as three years in Belgium and France). By age 5, by far the majority of the age cohort is enrolled in either pre-school or primary education in many countries, as shown in Figure 2.2. These data should be read with caution: they do not cover non-educational or informal forms of ECEC.

Other countries, usually those which consider ECEC to be compensatory or need-based rather than a universal right or standard, take a more targeted approach.[9] In the United States, for example, much publicly-provided ECEC for 0 to 5-year-olds limits eligibility to low-income or at-risk children and families. However, even for these groups, access is not universal, coverage is often part-day and the quality of services is often mediocre or poor. Further, where public provision is only for those at-risk, two-tiered systems have tended to develop in which better off children experience high-quality provision, while at-risk

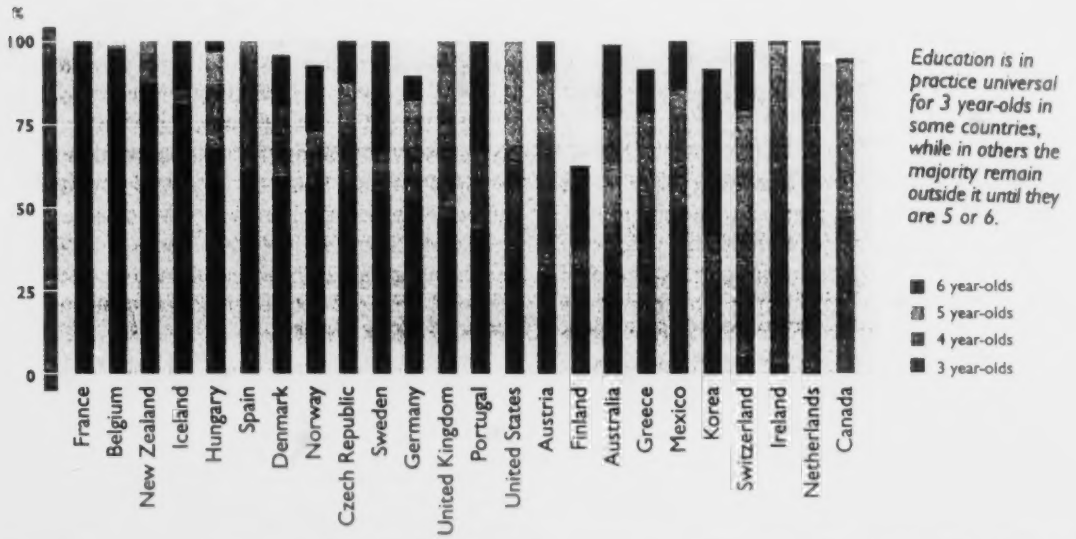
9. The question of eligibility of children with special needs is also an important issue. Some countries view children with disabilities as best served through separate and focused specialised help, while others have sought to integrate children with disabilities in all services. The Nordic countries and Italy have pursued a policy of fully including such children in all branches of education. Children with special needs who are able to benefit from education alongside other children enjoy the same access to learning opportunities as any other child, and in certain circumstances they may benefit also from affirmative action. See OECD (1995 and 1998a).

Who is eligible for publicly-provided ECEC programmes?



BEST COPY AVAILABLE

Figure 2.2
Participation by age for children aged 3 to 6, 1996
Net enrolment rates by single year of age in pre-primary[1] and primary education



1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).

Source: OECD Education Database
Data for Figure 2.2, page 89

children are less likely to receive the full range of child development, health, and family services that are needed to optimise school readiness (Bush and Phillips, 1996; US GAO, 1995).

In nearly all OECD countries, the eligibility of the younger age group, 0-3 years, is much weaker than for older children. Most countries have no entitlement for infants, and places are provided only under certain conditions (age of child, special need, income of parents, their working situation, etc.). Of the OECD European countries, only seven – Belgium, Denmark, Finland, France, Iceland, Norway and Sweden – currently provide publicly-funded places for over 20% of the under-three population; several of these countries (Denmark and Sweden, for example) have about half in some form of publicly-supported programmes. In countries where caring for very young children outside the home is still considered to be a private matter, primarily serving to accommodate the needs of working parents rather than benefiting young children, public provision for infants and toddlers is much lower still – according to Oberhuemer and Ulich (1997), around 3%. Faced with these circumstances, working parents with very young children must seek solutions in the private market, where ability to pay determines accessibility, or rely on informal arrangements.

The access criteria and participation data, however, reveal little about the content and quality of the education and care opportunities provided. On these dimensions, there are wide differences among programmes, across and within countries.

Programme content in ECEC ranges on a continuum from custodial care that provides a safe environment for children while their parents

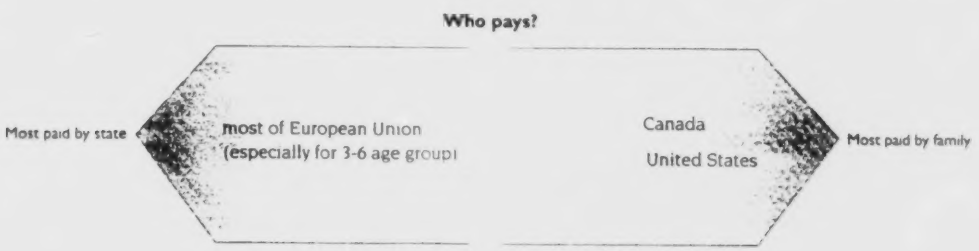
are working, to programmes designed to be developmentally and educationally stimulating (Cochran, 1993). While programmes for children aged 3 to 6 are more likely than earlier-age programmes to share characteristics with primary schools, this varies considerably from one country to another. In some cases there is a child-centred, developmentally-based model; in others pre-school is treated as a downward extension of formal schooling, introducing children to literacy and numeracy activities as early as possible. In Belgium, France, Luxembourg, the Netherlands, Spain, a primary objective of ECEC for 3 to 6-year-olds is to introduce learning skills and familiarise children with early schooling alongside broader social development (EURYDICE, 1994). With the objective of ensuring curricular continuity, France and parts of Belgium have introduced learning cycles that extend over the whole period of pre-primary and primary schooling, while Finland has developed "learning modules" for 5 and 6-year-olds in daycare centres and schools (Oberhuemer and Ulich, 1997).

In contrast, some countries separate early childhood from primary education and take a more holistic approach towards learning. Their programmes emphasise the importance of play and creativity, parental participation, family and community orientation, and informal, decentralised services that respond to local variation and needs. Public ECEC programmes in Norway and Sweden, for example, seek to promote children's multi-dimensional development, and purposely de-emphasise school-oriented pedagogy. This does not seem to cause difficulty in the development of reading or numerical ability among Scandinavian children. They perform well in international tests by the 8th grade although, in general, they have one year less of formal schooling than their counterparts in other countries (IEA, 1992; IEA/TIMSS, 1996). A possible reason for this result is that from an early age, the great majority of children in these countries participate in play-oriented early childhood programmes where structured activities enable them to develop literacy and numeracy skills.

ECEC programmes also differ in quality. Quality is a value-based concept, interpreted differently in different places according to the priorities of different stakeholders, the cultural and educational contexts and the relative weight given in individual programmes to education, care and other aims (Phillips, 1995; Moss and Pence, 1994; Woodhead, 1998). Yet, early studies showed that programme quality – gauged in terms of measurable outcomes, broadly defined – is associated with intensity and focus: a minimum of three hours a day for four or five days a week, extending over two years, and conducted in small groups by well-trained professionals (Royce *et al.*, 1983). To a greater or lesser extent, ECEC programmes differ within and among countries in quality through such factors as adequate inputs and sound processes. In this respect, a key policy target is the preparation and responsibilities of ECEC staff (Box 2.2).

b) Who pays?

Closely linked to access is the question of who pays for early childhood education and care: government, municipality, employers or parents. In what proportion should each contribute in an equitable system? Government subsidy, whether through direct expenditure on programmes or indirect support through tax breaks to families, enterprises or sponsors, has a clear role. Experience suggests that unless there is stable and well-targeted investment by the state, the children of low-income parents are denied equal access to good quality



BEST COPY AVAILABLE

BOX 2.2 WHO WORKS WITH CHILDREN IN ECEC PROGRAMMES?

The profiles of staff working with children in ECEC programmes vary greatly across countries, as well as from one programme to another within countries, particularly where there is an administrative and cultural split between welfare and education sectors. These variations reflect different priorities about what ECEC is expected to achieve and different views of its workers.

Some key points of difference among countries include:

Orientation of training and professional identity to an educational curriculum or a wider role. Countries such as Belgium, Greece and Spain orient pre-school education to the transmission of knowledge and cultural traditions, and prepare staff accordingly. The Nordic countries aim to provide broad social and family support, and "pedagogues" tend to view their roles not so much as early childhood specialists or teachers but as social network experts.

Links with primary education. In more educationally-oriented systems – including France, Italy, the UK and Ireland – pre-primary staff share training arrangements and qualifications with some or all primary school teachers.

Educational level required. In most Western European countries and Japan, centre-based staff need to be university graduates. In the United States, staff have lower status and are poorly paid, and few college graduates are attracted. In most countries, people working in the welfare service and with younger children (i.e. the under 3's) tend to have had less education and training. But where services have been integrated, notably in the Nordic countries, there tends to be more consistency, with high training levels established across ECEC.

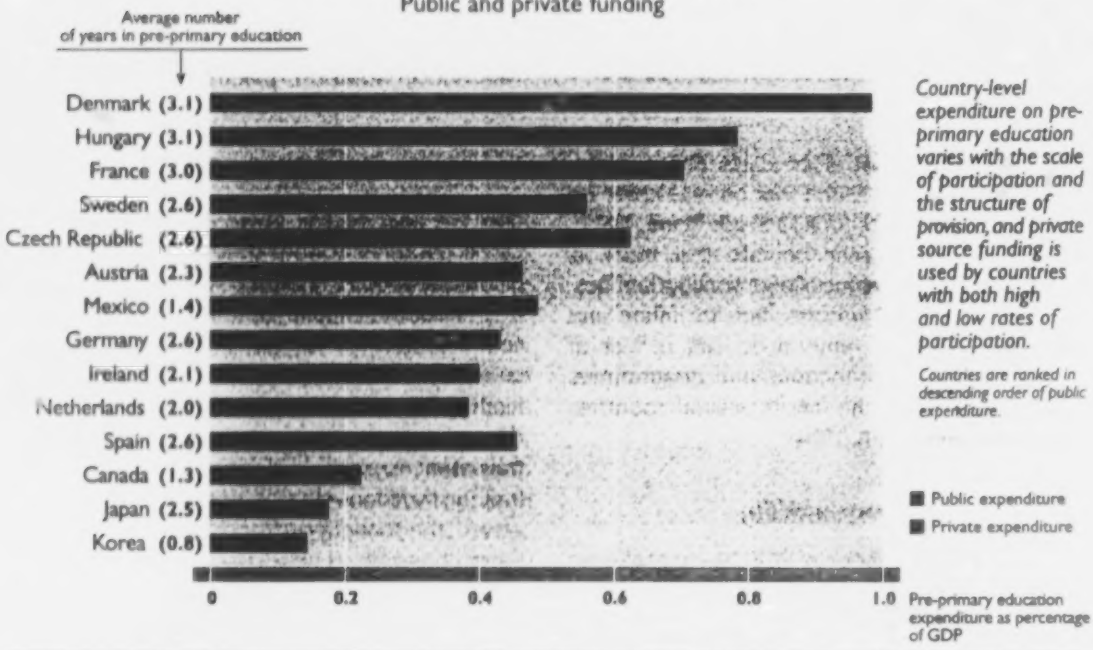
Home-based vs. centred based. In many countries, there are no training or education requirements for family childcare providers. However, in countries where family care providers are publicly-organised or funded (as is the case for nearly all such provision in the Nordic countries), training and education requirements have been established. Only France requires education and training for all family childcare providers, both private and publicly employed.

The degree to which staff are trained for specific age groups or tasks. Belgium, Greece and Luxembourg consider a high degree of specialisation to be necessary for service quality. Denmark however trains its *paedagoger* for all childhood services, out-of-school provision and services for people with special needs. Italy and Germany are moving towards such a generalist ethos.

The degree to which ECEC *is a woman's domain.* Traditionally it has been heavily so, but some countries seek to change this in order to provide role models of both sexes to young children. Denmark has enjoyed relative success in this, with 25% of those in pre-service training for *paedagoger* posts now male.

Expansion of provision across a wide range of ECEC programmes, a strengthened policy interest in programme quality, the broader decentralisation in the administration and governance of education and care services, and policies which make it easier for mothers with very young children to stay at home (e.g. paid leave) are now combining to alter the responsibilities and desired profiles of early childhood education and care staff as well as to influence the choices of those who may consider entering or remaining in such posts (Christopherson, 1997).

Figure 2.3
Financing pre-primary education[1], 1995
Public and private funding



1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).

Source: OECD Education Database.
Data for Figure 2.3, page 89.

early care and education services (Siegel and Loman, 1991). But in order to maximise the effectiveness of constrained public resources, the cost of providing ECEC is usually shared among national/local government, business, and parents. In all countries, the financial burden on parents, especially for children 0-3, is higher than for 3 to 6-year-olds.

Figure 2.3 shows levels of spending on centre-based early childhood (pre-primary) education, expressed as a percentage of GDP. There is no apparent link across countries between the scale of participation in such programmes and modes of financing. In two countries in which very young children spend three or more years in pre-primary education, for example, private sources account for 20% or more of expenditure in Denmark but less than 10% in France. Differences in overall spending on pre-primary education also reflect differences in the ways provision is organised, which lead to substantial differences in spending per child. Japan and Austria have similar rates of participation, but spend on a per child basis different amounts: respectively, US$2 476 and US$4 907. Note that these figures and comparisons refer to pre-primary education, as one part of a wider range of ECEC services.[10]

In some countries, public investment in ECEC is large and, for non-governmental providers, profit as incentive is discouraged and parents pay fees on a sliding scale according to their family income. Finland and Norway allow private companies to develop employee ECEC programmes with some

10. Data for selected countries are shown in Statistical Annex, page 89.

BEST COPY AVAILABLE

state subsidies. In a number of countries, parents may cover one-quarter to one-third of operating service costs. Other countries allow for a greater public-private mix and rely to a greater extent on the profit incentive to open up and make responsive the supply of ECEC. Looked at from another angle, most U.S. parents purchase ECEC in the private market and bear most of the costs. For example, one four-state study found that parents cover up to 80% of ECEC costs (CQCO Study Team, 1995), and fees and related costs can take up as much as one-quarter of the income of poor working families. In most European countries, fees for infant and toddler programmes amount to 10% or less of the families' average income, and programmes for 3 to 5-year-olds are free in several countries (Kamerman and Kahn, 1994).

c) *Administrative responsibility*

The public administration of ECEC systems follows broadly three models. The prevailing model in OECD countries is a "split" or dual system, in which the education authorities are responsible for pre-school education, and the health or social affairs authorities supervise care, generally for younger infants and toddlers. A second model, unified administrative arrangements, has been adopted by New Zealand, Sweden, Norway and Spain. A third model has been adopted in Japan, Korea, the United Kingdom and the United States, in which both education, health and social affairs ministries run parallel systems for young children.

The merits of unifying systems are evident. Split systems have different funding streams, objectives and service mechanisms for each sub-system, despite a growing overlap in underlying goals and types of family served. The unified system generally ensures a more rational use of resources and the implementation of care and education not as separate activities for different age groups but as essential components of all programmes for young children. In addition, placing ECEC under the auspices of one department allows clear objectives, policies and budgets for early childhood to be formulated and proposed (OECD, 1998*a*).

Over the past decade, there has been a move in OECD countries toward decentralisation of early childhood services. In certain instances, this movement would seem to undermine policy coherence: central authorities can find it difficult to maintain co-ordination between educational, welfare and health aspects with increasing decentralisation, deregulation, and privatisation. But since decentralisation responds to a desire to bring policy and funding decisions closer to the populations being served, the challenge is for central government to permit this shift while retaining the authority and capacity to monitor fair access to ECEC and maintain high quality services across regions and forms of provision.

There is a role for national governments in ensuring that local or regional authorities secure the resources to implement their policies. It is worth noting that in some countries, e.g. in the Netherlands, Norway and Sweden, decentralisation has enabled local authorities to combine funding streams and develop municipal departments for early childhood provision – integrated across age groups and sectors. Potentially, integration can be more feasible in the delivery of locally run services than it has been at national policy level. Partnerships with providers from other sectors can also help: the Dutch central government and municipalities contract the non-profit

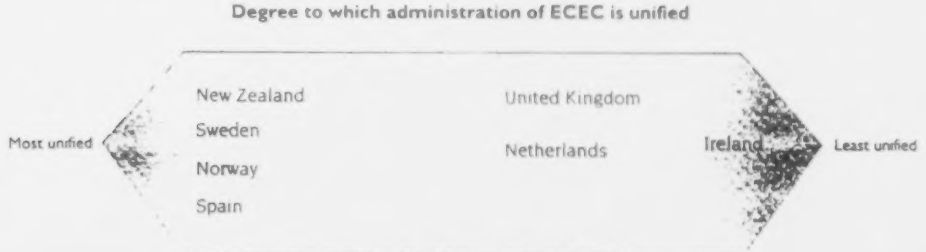


Figure 2.4
Percentage of mothers aged 30 to 39 who work when their children are under 5, 1986 and 1997

In nearly all countries, married and single women with very young children are now more likely to be working.

Countries are ranked in descending order of the 1997 percentage of married mothers who work when their children are young.

1. Data refer to all women (single and married), aged 16 and older, with children under 6.

Sources: European Commission (1999), U.S. Bureau of Labour Statistics (1998).
Data for Figure 2.4, page 89

private sector to provide many early childhood services, especially to include groups that are difficult to reach through mainstream service provision (Kloprogge, 1998).

d) How work and family responsibilities are reconciled

The reconciliation of work responsibilities with family commitments is a major challenge in industrial democracies. Figure 2.4 shows that in a large number of OECD countries mothers with very young children are now more likely to be working. The demand for early care and education services for infants and young children – especially from the age of 18 months to entry into nursery school – is likely to grow as more women aspire to combine motherhood with paid employment and careers. But the growth in concern about children's outcomes has made this more than a purely economic issue of finding childcare for the children, thereby allowing mothers to work.

The approaches adopted in OECD countries lie on a continuum from *laissez-faire* to direct public provision of out-of-home early childhood education and care. The tendency in several countries is to take a wider, *shared responsibility* approach in which governments do not just support out-of-home childcare but help enable parents to look after young children. This approach aims to reconcile work with family responsibilities. Such a strategy seeks to balance economic considerations (maternal care is less costly than extended public provision in the child's first year of life), labour market considerations (enabling or encouraging parents to enter and remain in work), child development considerations (ensuring that opportunities are fully available, under the right conditions) and equality of opportunity considerations (ensuring that women are not placed at a disadvantage in employment and careers). In countries where publicly funded childcare has not met demand, it has been expanded (e.g. in Germany, the Netherlands and Spain). At the same time, parents are given the option through paid maternity and parental leave to care for their young children at home. Leave at full- or partial pay ranges from 12 to 16 weeks in the majority of countries, to about a half-year in the

BEST COPY AVAILABLE

Table 2.2
Summary of maternity and parental leave in selected OECD countries

Country	Maternity leave	Parental leave
Australia	Some employers provide paid leave (covers 17% female workers) or unpaid leave.	12 months unpaid parental leave available for all workers.
Austria	100% salary for 16 weeks, if insured.	Flat rate payment with two-year parental leave, funded from unemployment insurance, for children born after 1990.
Belgium	82% salary in first month, 75% salary for further 11 weeks, if insured (most are covered).	Three month leaves for father or employed mother, available until child turns 4, possible payments for loss of employment.
Canada	55% salary up to max limit, for 15 weeks, under unemployment insurance scheme.	
Czech Republic	69% earnings for 28 weeks, if insured.	
Denmark	60% earnings for 30 weeks, if insured.	
Finland	Earnings replacement declines with income, for 155 workdays if insured.	Parental allowance available to either parent for further 158 workdays. Unpaid care leave available until child turns 3.
France	100% of earnings to max limit if insured, 16 weeks if first child, 26 weeks for subsequent child, up to 46 weeks for multiple births.	
Germany	100% earnings for 16 weeks then 80% earnings for 8 weeks.	Parental leave allowance is a state benefit available to either parent for first 18 months of a child's life. Parental leave available until child turns 3.
Greece	50% of reference salary for 16 weeks to working mothers. Full salary paid to civil servants. Some employers (e.g. in banking sector) supplement maternity benefit to provide full income replacement. Limited to employees (self-employed not covered).	
Hungary	100% earnings for 24 weeks, if insured.	
Iceland	Flat rate for 6 months for all mothers, supplement provided to previous workers.	Working fathers also eligible after first month.
Ireland	70% earnings up to a ceiling, minimum payment, for 14 weeks, if insured.	
Italy	80% earnings for 5 months, if insured.	Additional 30% salary for 6 months for either parent (can be extended to three years if child is disabled); alternatively a working parent can take time off from work in lieu of financial payment; 30 days a year paid leave until child turns 3.
Japan	60% basic wage for 98 days, if insured.	25% earnings during child care leave in first year.
Korea	Paid maternity leave for 60 days, if previously employed.	Public employees can access leave without pay up to one year (public school teacher who has public employee status for three years) as family leave. Previously employed mothers or fathers can access unpaid child care leave (which cannot exceed one year) including paid maternity leave, after the birth.

BEST COPY AVAILABLE

Luxembourg	100% earnings for 16 weeks, if insured; alternative flat-rate payment for 16 weeks	
Mexico	100% average earnings for 84 days, if insured	
Netherlands	100% earnings for 16 weeks, if insured	Three months unpaid leave (may be paid, under specific collective bargaining agreement, law on career interuptions or if public employee); self-employed receive a benefit based on loss of income
New Zealand	Means-tested sickness benefit rates, for 6 months, mainly single women eligible	
Norway	100% earnings for 42 weeks or 80% earnings for 52 weeks	Fathers can use mother's unused maternity benefit, also have their own 4 weeks (within the 42/52 week limit) non-transferable to mother
Poland	100% earnings for 16 weeks for first birth, if insured; longer period for subsequent births	Flat-rate benefit available for leave up to 24 months after maternity benefit
Portugal	100% earnings, minimum payment 50% minimum wage, for 98 days with 60 days after confinement, if insured	Father can access maternity benefit if mother unwell or parents decide
Slovak Republic	90% earnings, up to max amount, for 28 weeks, if insured	Father can access extended parental leave for child under 3
Spain	100% benefit base payable 16 weeks, if insured	
Sweden	Reduced earnings replacement, payable 450 days	Maternity benefit is a shared entitlement for both parents
Switzerland	10 cantons provide means-tested benefits to mothers. The employer is obliged to pay 3 weeks salary during the first year of service and after that there are wide disparities in practice. In some cases there may be insurance against loss of earnings	6 cantons provide full or reduced benefits to fathers
Turkey	Employees receive 66.7% earnings for 12 weeks; active national civil servants receive 100% earnings for 9 weeks (including 6 weeks after the childbirth) and a leave of 1.5 hours per day for child-feeding	Employees receive, upon request, up to 6 months unpaid leave, if insured; active national civil servants receive, upon request, up to 12 months unpaid leave if insured
United Kingdom	90% average earnings for 6 weeks, flat rate for further 12 weeks, if insured; lower flat-rate benefit for 18 weeks if not eligible for above	
United States	Variable earnings replacement, maximum amount, payable up to 52 weeks (e.g. available in five states)	12 weeks unpaid leave available for specified family/medical reasons, including birth and care of newborn child; 24 hours paid leave for federal employees for child-related activities

Source: Kalisch, Aman and Buchele (1998), and detailed responses to OECD Caring World synthesis questionnaire, and country-provided information.

BEST COPY AVAILABLE

Czech Republic, Hungary, Iceland and the Slovak Republic, to a year or more in Norway and Sweden. Maternity and parental leave provisions differ not only in the duration of benefits, but also in benefit levels and eligibility requirements, making country comparisons difficult (see Table 2.2). The Dutch approach, for example, follows a so-called combination scenario which takes into account dual careers, part-time work, parental care and care facilities, private financing and provision of government and employers. Nonetheless, generally more favourable provisions in European countries mean that children under one year are now less often than before seen in childcare programmes (France is an exception) while, at the same time, publicly funded care for 2 and 3-year-olds is growing (Kamerman and Kahn, 1994).

However, as the social, economic and cultural contexts of countries can differ greatly, research is needed at national level to measure the short- and long-term effects on young children of different levels and mixes of childcare provision, maternal benefits and parental leave options and the issues of costs, labour market impacts, and social and economic consequences.[11]

4. CONCLUSIONS

Early childhood education and care is now a well-established policy field within individual countries. Understanding across countries remains relatively weak, however, partly because there is no uniform system for collecting standard data and partly because dissemination of knowledge from different programmes in different countries has so far been limited. The present analysis brings together elements of what is known and offers an analytical framework, but it points to the need to strengthen the international knowledge base. Many of the issues are being examined in the OECD's thematic review of early childhood education and care policy. That work is also clarifying and beginning to address some of the more important information and data needs from a comparative perspective.

This chapter has shown that ECEC can have important benefits for children in both the short and the long term, but suggested that such benefits are not inevitable. As further research continues to interact with the development of policy, the impact of specific programme features, which vary greatly among programmes and countries, will need to be considered. One priority is to emphasise programme quality. But in addition, some important choices about the objectives and relationships underpinning ECEC programmes have been identified.

First, the relationships between programme partners vary according to whether the aim is to provide a universal service with wide access supported by state funding or whether public intervention is on a more selective basis. An important insight from recent policy development is that provision of a universal service does not necessarily undermine family responsibilities, since funding can be used to support home and family-based care as well as to provide alternatives. As the outcomes resulting from early childhood experience become clearer and knowledge of how to support families to foster child development increases, the public interest widens and grows.

Second, there is a great variation between systems in terms of the priority they give to the cognitive as opposed to the wider social development of children, especially immediately before entering school. It seems clear that both are needed to approach children's development holistically, and each country will find a balance appropriate to its own objectives. However, the relative neglect of programmes for children under 3 compared to pre-school provision, together with research showing the importance of social as well as cognitive development in children's futures, should encourage countries to look closely at whether they have achieved an appropriate balance. ■

11. In particular, it is unclear whether new provisions in work legislation, maternity leave and childcare services or support offer a sufficient margin to exercise the full range of options for work and family. In this respect, the situation in European Union countries is rapidly evolving (EC Network on Childcare, 1996). Through the 1998 Employment Guidelines adopted by Ministers, EU member states have agreed to expand parental/family leave schemes and in parallel, to expand the level of public care provision for the children under 3. From a different starting point, initiatives in a number of US states (under broad federal legislation and funding) establish new training and work requirements for social welfare beneficiaries. Increases in targeted ECEC provision are under consideration.

References

BARNETT, W. S. (1995), "Long-term Effects of Early Childhood Programs on Cognitive and School Outcomes", *The Future of Children Long-term Outcomes of Early Childhood Programs*, Vol. 5(3), Packard Foundation, Los Altos, Californian pp. 25-50.

BERRUTA-CLEMENT, J.R. *et al.* (1984), *Changes Lines: The Effects of the Perry Pre-School Program on Youth through the Age of 19*, High Scope Press, Ypsilanti, MI.

BERTELSEN, O. (1991), quoted in Sommer, D., "Children's Living Conditions: Secular Changes and Childhood Mythology", *Educare in Europe*, UNESCO, Paris.

BRAITHEWAITE, J. (1983), *Explorations in Early Childhood Education*, Australian Council for Educational Research, Hawthorn, Victoria.

BUSH, J. and **PHILLIPS, D.A.** (1996), "International Approaches to Defining Quality", in S.L. Kagan and N.E. Cohen (eds.), *Reinventing Early Care and Education: A Vision for a Quality System*, Jossey-Bass, San Francisco, CA, pp. 65-80.

CARNEGIE TASK FORCE ON MEETING THE NEEDS OF YOUNG CHILDREN (1994), "Starting Points: Meeting the Needs of our Youngest Children. Report of the Carnegie Task Force on Meeting the Needs of Young Children", Carnegie Corporation of New York, New York.

CHRISTOPHERSON, S. (1997), "Childcare and Elderly Care: What Occupational Opportunities for Women?", Labour Market and Social Policy Occasional Papers No. 27, OECD, Paris.

COCHRAN, M. (1993), "Public Child Care, Culture and Society: Crosscutting Themes", in M. Cochran (ed.), *International Handbook of Child Care Policies and Programs*, Greenwood Press, Westport, CT, pp. 627-658.

COST, QUALITY, AND CHILD OUTCOMES (COCO) STUDY TEAM (1995), *Cost, Quality and Child Outcomes in Child Care Centers*, Department of Economics, University of Colorado at Denver, Denver, CO.

EC NETWORK ON CHILDCARE (1996), *A Review of Services for Young Children in the European Union*, European Commission, Brussels.

EDUCATION COMMISSION OF THE STATES (1996), "Bridging the Gap between Neuroscience and Education: Summary of a Workshop", Denver, Colorado.

EUROPEAN COMMISSION (1999), "Employment Performance in the Member States: Employment Rates Report 1998", Brussels.

EURYDICE (1994), *L'enseignement préscolaire et primaire dans l'Union européenne*, Unité Européenne d'EURYDICE, Brussels.

GALINSKY, E., HOWES, C., KONTOS, S. and **SHINN, M.** (1994), *The Study of Children in Family Child Care and Relative Care*, Families and Work Institute, New York, NY.

GOMBY, D. S., LARNER, M. B., STEVENSON, C. S., LEWIT, E. M. and **BEHRMAN, R. E.** (1995), "Long-term Outcomes of Early Childhood Programs: Analysis and Recommendations", *The Future of Children: Long-term Outcomes of Early Childhood Programs*, Vol. 5(3), pp. 6-24.

GUSTAFSSON, S.S. and **STAFFORD, F.P.** (1995), "Links between Early Childhood Programs and Maternal Employment in Three Countries", *The Future of Children: Long-term Outcomes of Early Childhood Programs*, Vol. 5(3), pp. 161-174.

INTERNATIONAL ASSOCIATION FOR THE EVALUATION OF EDUCATIONAL ACHIEVEMENT – IEA (1992), *How in the World do Children Read?*, W.B. Elly, Grindeldruck, Hamburg.

INTERNATIONAL ASSOCIATION FOR THE EVALUATION OF EDUCATIONAL ACHIEVEMENT/THIRD INTERNATIONAL MATHEMATICS AND SCIENCE STUDY – IEA/TIMSS (1996), *Mathematics Achievement in the Middle School Years*, A.E. Beaton, Boston College, Boston.

JAROUSSE, J. P., MINGAT, A., and **RICHARD, M.** (1992), "La scolarisation maternelle à deux ans: effets pédagogiques et sociaux", *Education et Formation*, Ministère de l'Education Nationale et de la Culture, Paris, April-June.

KAGITCIBASI, C. and **BEKMAN, S.** (1991), *Cognitive Training Programme*, Finans Vakyf Publications, Istambul.

KALISCH, D.W., AMAN, T. and **BUCHELE, L.A.** (1998), "Social and Health Policies in OECD Countries: A Survey of Current Programmes and Recent Developments", Labour Market and Social Policy Occasional Papers, No. 33, OECD, Paris.

KAMERMAN, S.B. and **KAHN, A.J.** (1994), *A Welcome for Every Child: Care, Education and Family Support for Infants and Toddlers in Europe*, Zero to Three, National Center for Clinical Infant Programs, Arlington, VA.

KELLAGHAN, T. and **GREANEY, B.J.** (1993), "The Educational Development of Students Following Participation in a Pre-school Programme in a Disadvantaged Area in Ireland", Studies and Evaluation Paper No. 12, Bernard van Leer Foundation, The Hague.

KLOPROGGE, J. (1998), "Background Report of the Netherlands", Océ OFS, Ministry of Education, Culture and Science, Zoetermeer.

LAMBERT, J.F. (1996), "Des règles du jeu", *Educating the Young Child in Europe*, Report of the European Seminar of OMEP, UNESCO, Paris, 24-27 October.

BEST COPY AVAILABLE

LAZAR, I. R., DARLINGTON, R., MURRAY, H., ROYCE, J. and **SNIPPER, A.** (1982), *The Lasting Effects of Early Education. A Report from the Consortium of Longitudinal Studies*. Monographs of the Society for Research in Child Development, Series No. 195, Vol. 47, pp. 2-3.

LEIBOWITZ, A., KLERMAN, J.A. and **WAITE, L.J.** (1992), "Employment of New Mothers and Child Care Choice: Differences by Children's Age", *Journal of Human Resources*, Vol. 27, No. 1, pp. 112-133.

LINDSEY, G. (1998), "Brain Research and Implications for Early Childhood Education", *Childhood Education*, Vol. 75(2), pp. 97-101.

McKEY, R., CONDELLI, L., GANSON, H., BARRET, B., MCCONKEY, C. and **PLANTZ, M.** (1985), "The Impact of Head Start of Children, Families, and Communities", Final report of the Head Start Evaluation, Synthesis, and Utilization Project, US Department of Health and Human Services, Washington, DC.

MINISTÈRO DA EDUCAÇAO (1999), *Early Childhood Education and Care in Portugal*, Departamento da Educação Básica, Lisbon.

MOSS, P. and **PENCE, A.** (eds.) (1994), *Valuing Quality in Early Childhood Services: New Approaches to Defining Quality*, Paul Chapman, London.

NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT – NICHD (1997), "Mother-Child Interaction and Cognitive Outcomes Associated with Early Child Care: Results of the NICHD Study", Society for Research in Child Development meeting symposium, Washington, D.C.

OBERHUEMER, P. and **ULICH, M.** (1997), *Working with Young Children in Europe: Provision and Staff Training*, Paul Chapman, London.

OECD (1995), *Our Children at Risk*, Paris.

OECD (1996*a*), *Lifelong Learning for All*, Paris.

OECD (1996*b*), *Successful Services for our Children and Families at Risk*, Paris.

OECD (1998*a*), *Overcoming Failure at School*, Paris.

OECD (1998*b*), *Co-ordinating Services for Children and Youth at Risk – A World View*, Paris.

OECD (1998*c*), *Education at a Glance*: OECD Indicators, Paris.

OECD (1998*d*), "Early Childhood Education and Care Policy: Proposal for a Thematic Review", document DEELSA/ED(98)2, Paris.

OSBORN, A.F. and **MILBANK, J.E.** (1987), *The Effects of Early Education: A Report from the Child Health and Education Study*, Clarendon Press, Oxford, UK.

PHILLIPS, D.A. (ed.) (1995), *Child Care for Low-income Families: Summary of Two Workshops*, National Academy Press, Washington, DC.

RIBAR, D.C. (1995), "A Structural Model of Child Care and the Labour Supply of Married Women", *Journal of Labour Economics*, Vol. 13, No. 3, pp. 558-597, July.

ROYCE, J. *et al.* (1983), mentioned in *As the Twig is Bent*, Consortium for Longitudinal Studies, Erbaum and Associates, Hillsdale, NJ.

SCHWEINHART L.J., BARNES, H.V. and **WEIKART, D.P.** (1993), *Significant Benefits: The High/Scope Perry Preschool Study Through Age 27*, High/Scope Educational Research Foundation, Ypsilanti, MI.

SHINN, M., GALINSKY, E. and **GULCUR, L.** (1990), *The Role of Child Care Centers in the Lives of Parents*, Department of Psychology, New York University, New York.

SHORE, R. (1997), *Rethinking the Brain: New Insights into Early Development*, Families and Work Institute, New York.

SIEGEL, G.L. and **LOMAN, L.A.** (1991), "Child Care and AFDC Recipients in Illinois: Patterns, Problems and Needs", Prepared for the Division of Family Support Services, Department of Public Aid, Illinois, Institute of Applied Research, St. Louis, MO.

UNESCO (1998), *Early Childhood Care and Education as a Structural Approach to Integrating Children and Families at Risk*, Paris.

U.S. BUREAU OF LABOR STATISTICS (1998), *Employment Characteristics of Families in 1997*, Washington, D.C.

U.S. GENERAL ACCOUNTING OFFICE (1995), *Early Childhood Centers: Services to Prepare Children for School often Limited*, Washington, D.C., pp. 95-21.

U.S. SOCIAL SECURITY ADMINISTRATION (1995), *Social Security Programmes throughout the World*, Washington, D.C.

VAN DER GAAG, J. and **TAN, J.P.** (1996), *The Benefits of Early Child Development Programmes: An Economic Analysis*, World Bank, Washington, D.C.

WHITEBOOK, M., HOWES, C. and **PHILLIPS, D.** (1989), "Who Cares? Child Care Teachers and the Quality of Care in America: Final report of the National Child Care Staffing Study, Child Care Employee Project, Oakland, CA.

WOODHEAD, M. (1998), "Quality in Early Childhood Programmes – A Contextually Appropriate Approach", *International Journal of Early Years Education*, Vol. 6, pp. 5-18.

WYLIE, C. (1994), *What Research on Early Childhood Education/Care Outcomes Can, and Can't Tell Policymakers*, New Zealand Council for Educational Research, Wellington.

CHAPTER 3

TECHNOLOGY IN EDUCATION: Trends, investment, access and use

Summary

Schools and education ministries are by now well aware of the importance of integrating information and communication technologies (ICT) into teaching and learning, both to prepare students for the information society and to make the most of new learning tools. Yet the education world is constantly struggling to keep up with successive challenges from ICT. Educators need to develop a coherent set of priorities that harness the technology to meet their goals, rather than simply running to keep up with change.

Investment in hardware, software and telecommunication links has been growing exponentially. Over the OECD as a whole, approximately US$16 billion is invested annually – still only 1-2% of all education spending, yet a huge resource. In the United States, more is now spent on ICT in schools than on books and other printed materials.

This investment has improved access to computers and to the Internet, yet resources remain unevenly distributed both within and across countries. Secondary schools have between 35 (Portugal) and under 6 (Norway) children per computer; primary schools vary even more: from 150 (Portugal) to 8 (the United States). Some countries such as Ireland now have all secondary schools linked to the Internet; in Korea it is just one in five. Within countries the correction of unequal access to ICT among schools with different social profiles is becoming a key equity issue: schools themselves need to correct the much greater inequality of access in the home.

High quality programmes and intelligent usage are of great importance. However, less than one third of ICT spending goes toward software and teacher training. Teachers, in partnership with providers, should become more involved in software development. The process is circular: if school leaders are convinced that ICT can address central educational goals, more money and effort will be diverted into developing and using material that lives up to this promise.

Part of this engagement requires computer use to become integral to the school routine. In Denmark and Iceland, two-thirds of final-year secondary school students use computers at least weekly; in Hungary and the Czech Republic, two-thirds rarely use them. To encourage more regular usage, software quality assurance is essential. Efforts are being initiated at an international level to assist with software evaluation.

Resource allocation, access and equity, teacher development, quality assurance, partnerships: these central issues for education systems are now closely linked to the successful development of ICT. So technology in schools is no longer a self-contained topic but a key feature of the mainstream education debate.

1 INTRODUCTION

The development of the global information society places new demands on the creation and delivery of learning materials and educational services. First, students need to learn to function well in such a society. Second, education systems must learn to harness ICT to access a wider knowledge base and to help develop a new technology of learning. Both these imperatives are now well understood in OECD countries, with everyone from ministers to teachers acknowledging their centrality to future educational development. Yet in this still rapidly-changing sphere, the education world struggles to respond adequately to successive demands.

What has so far been achieved, and where should future priorities lie? This chapter looks at three aspects of the growing use and impact of ICT in education. First, the level of *investment* in ICT, how it has grown over time and in particular the degree to which resources have been distributed between hardware, software, telecommunication links and teacher training. Second, the level, nature and distribution of *access* to computers and to the Internet. Third, the amount and nature of ICT *use* by both students and teachers. An underlying theme is that today's rapid rise in total investment and access levels may be a necessary condition for the satisfactory use of ICT in education, but it is far from sufficient. Much also depends on the supply of good quality software and its intelligent use, both of which rely on a more active engagement of teachers, in developing the technology and its uses in partnership with manufacturers.

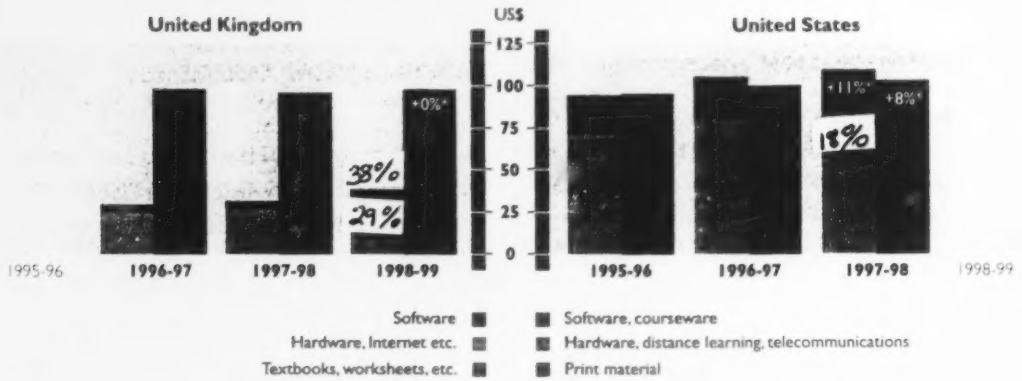
Such issues have been talked about in education for at least a decade (see, e.g., OECD, 1989). What is new is that they have become such a central part of the mainstream education debate, affecting decisions about funding as well as about learning methods and content. The importance attached to learning as a key to competitiveness causes education systems to seek more efficient ways of delivering effective access to complex and growing fields of knowledge. This creates a pressure to change what and how people learn, and also to seek new funding models to reach a wider group of learners at different stages of their lives. Even within public budgets, there is a continuing need to examine how spending should be allocated between the payment and training of teachers, investment in equipment, purchase of ICT learning resources and the purchase of traditional resources such as books.

Political recognition of the importance of ICT is reflected in ambitious, high-profile plans to universalise access to computers and to the Internet, including "Technology Literacy Challenge" in the United States, "The National Grid for Learning" in the United Kingdom and "Schulen am Netz" in Germany. Such initiatives are designed not only to promote ICT skills, but also to enable students to access material previously unavailable to them – and hence widen their learning opportunities.

Overall spending on ICT in education has grown enormously, now amounting to some US$16 billion spent directly by schools and other education institutions across OECD countries. Such sums represent both a growing market opportunity for companies and a significant, if still small in percentage terms, portion of education budgets. But where are these resources being deployed – in buying computers for schools, in getting them on-line, in providing multimedia software and on-line resources, or in upgrading teachers' capabilities? A coherent strategy requires a balance between all of these components as well as close attention to how they are used. As illustrated in Section 2 below, however, the bulk of resources presently are being spent on providing infrastructure rather than ensuring effective use.

The following analysis draws on data available on ICT in "formal learning settings" mainly in primary and secondary schools, but also with a few examples from tertiary and adult education. Since comprehensive data across countries are often unavailable, it relies heavily on illustrative data and examples gathered from diverse sources, including key educational ICT experts in OECD countries and Internet research. The field is evolving very rapidly, so some of the patterns and trends described in this chapter are already being overtaken by new policy initiatives and wider

Figure 3.1
Spending on learning resources in primary and secondary education
Expenditure per student, constant US$



Spending on ICT is growing rapidly, and in the United States has outstripped spending on printed resources in schools.

The definitions used in the U.K. and U.S. surveys are similar, but not identical.
* Percentages show growth over 2 years.
Sources: British Educational Suppliers Association (1999); Education Market Research (1999); OECD Education Database.
Data for Figure 3.1, page 90.

developments. The OECD, through its ongoing activity "ICT and the Quality of Learning" and other work, aims over the next two years to fill some of the gaps in data and information on practices and policies in different educational and country settings. The final section examines a range of key policy issues that arise from the analysis.

2. INVESTMENT IN ICT IN EDUCATION

Investment in ICT in schools is growing rapidly in all OECD countries, but from a low starting point. In the OECD countries where the schools are most "technology intensive", the total ICT expenditures make up between 1-2% of the total primary and secondary education budget. In other countries these expenditures constitute less than 1% of spending on schools. Section 2 examines this spending, but it should be borne in mind that such "institutional" expenditures probably make up less than a quarter of the market for educational ICT, the remainder being devoted to professional/business and home/consumer spending.

There is no standardised definition of what is included in the ICT expenditures in schools. For example, there is no general agreement on whether service/maintenance or teacher training should be counted. Furthermore, school accounting systems do not make explicit ICT-related spending, so data have to be extracted from several headings in budgets. Where data exist, they tend therefore to come from surveys.

But two countries, the United States and the United Kingdom, have fairly detailed data, and certain features of these countries help illustrate some general points about investment patterns in recent years. These are summarised in Figure 3.1.[1]

Both the UK and the US represent advanced markets for school ICT. Although the US presently has higher expenditures and ICT resources per student, the UK has a high level of computer penetration when compared to many other

1. More detailed breakdowns may be found in the Statistical Appendix, page 90.

countries (see Figure 3.2). A rough approximation of the total spent on ICT by institutions in OECD countries can be made by considering that the United States has slightly fewer than half as many pupils as all other countries combined, but these countries have slightly under half as many computers per pupil.[2] So other OECD countries combined probably spend a roughly similar amount as the United States. The US spends about US$5 billion on ICT in primary and secondary education, to which one can add US$3 billion spent at the level of tertiary education (Software Publishers Association, 1998*b*). This implies that the whole of the OECD spends of the order of US$16 billion for ICT in education (including tertiary).

Three trends stand out from the patterns of spending in the UK and US shown in Figure 3.1.

The first is the rapid pace of growth in all areas of ICT. In the United States, spending on hardware and software has grown in the order of 16% over the most recent two years; in the United Kindgom, starting from a lower base, two-year growth is around 30%. At this rate, spending levels are doubling every five years – a faster rate of growth than for other educational equipment, and much faster than for overall educational spending.

The second trend is the closing of the gap between spending on ICT and on printed items such as textbooks. In the U.S. schools, investment in electronic resources has actually overtaken spending on paper resources. Although in the United Kingdom spending on paperware is more than twice the combined spending on hardware and software, if present trends continue, it will be overtaken within five years. But it is also notable that in both countries ICT growth appears to be supplementary rather than displacing expenditure on books.

Thirdly, software investment remains only a small part of the ICT investment total, which is not increasing as rapidly or much more rapidly than hardware spending (although in the UK both are growing very rapidly). Yet after an initial phase of capital investment in technological infrastructure and network connectivity, it is important that attention should shift to educational content, training and learning. Increased investment has already been directed towards teacher training and the development of so-called ICT skills (although the expenditures devoted to these activities remain low relative to all ICT investment – approximately 5% in the United States). But there remains an acute lack of *high quality* learning materials designed for the online environment, as well as a shortage of software that enables the use of such materials. It is important to recognise that this is not just a question of spending levels but of the dynamic that ensures quality. Here lies a "chicken and egg" problem: the ICT infrastructure will not demonstrate its worth to teachers without good educational content, yet where teachers remain to be convinced of the potential of the technology they will not engage in the creation of such content. Strong partnerships between users and providers can help to break this cycle.

Partnerships

No one can succeed alone in delivering education in a networked mixed media environment. Governments, funding authorities, institutions, publishers and broadcasters, channel owners/operators and technology/software companies all realise that they need to work with each other in a complex market. As a result, a variety of alliances continue to grow between different types of organisations, combining their resources to facilitate delivery of education over new and evolving networks. Schools, universities and libraries, publishers and broadcasters, are partnering with telecommunication and software providers. An exponential growth of such alliances is fuelled by the expectation that people across the world connected to digital networks will be able to receive educational content and services via the telephone, TV screen, PC and a range of new electronic delivery devices and means.

But, the growth of public-private partnerships in the education sector poses many challenges for policy development as well as management of both product development and implementation of services. Differences in culture and language,

2. Based on countries for which there are data. See Figure 3.2.

communication problems, differences in management approach and operations, conflicts between public and private interests, ownership and control of educational services, and quality assurance are some examples. Yet this has not stopped the proliferation of partnerships, ranging from small local schemes to Netd@ys, in which schools, private companies and families from all over North America, Europe, Australia and other regions and countries, work together to connect schools to local networks and the Internet. Box 3.1 gives examples of public-private partnerships promoting the use of ICT in education; Box 3.2 of specific agreements to give affordable Internet access.

Three key issues around partnerships are:

- The degree to which they focus on getting extra resources into schools. Despite the contributions made by companies such as those listed in Box 3.1, private sources still account for only a small fraction of ICT investment in schools (although this does not take into account the discounts of telecommunications costs). This makes it all the more important that partnership should represent more than just a financial donation.

BOX 3.1 **EXAMPLES OF PUBLIC-PRIVATE PARTNERSHIPS PROMOTING THE USE OF ICT IN EDUCATION**

Lottery funding and other private sources provided DM 30 million for computer-assisted teaching in schools in Berlin, Germany, in response to an application from the school authorities.

Intel, Hewlett Packard and Microsoft Corporation have developed a joint programme called "Applying Computers in Education" (ACE) to train teachers on the effective integration of technology into existing classroom curricula. Under this joint programme, about 1 250 teachers were trained and more than US$2 million worth of equipment and cash was awarded in the US and Chinese Taipei.

- The degree to which schools and teachers are able to explore and define their own ICT needs. At best, hardware and software systems should be co-designed by their users who know their real needs – in the case of education to ensure that they truly meet key learning goals. For this, teachers need to engage in a more active dialogue with the ICT industry.

- The degree to which education ministries are willing to accept partnerships that could compromise their control over learning content. At present, some ministries are clearly concerned about the loss of such control, whereas others are willing to accept greater pluralism of learning content and "learning control".

3. ACCESS TO ICT IN EDUCATION

All OECD countries have made major efforts to provide schools with computers and connect them to local networks and the Internet. Schools and libraries play a role in providing more equal access to these technologies, in light of the socially unequal level of access in the home.

The number of students per computer is the best available indicator of access to ICT, albeit a highly imperfect one. It is not collected on a regular basis in many OECD countries. It does not distinguish between new and old computers, which offer very different usage possibilities. Nor does it indicate actual use, or where the computers are located – which has an important effect on access.

Figure 3.2 (p. 13) shows the number of pupils per computer in primary and secondary education in countries reporting data to the OECD, over the 1996 to 1998 period. The figures show wide variations at both levels, but the greatest range in primary. Where figures over two years are available, the rise in computer intensity is marked: at the extreme, Ireland has halved the number of students per computer in a single year.

The most ICT-intensive countries in education are the US, Finland, New Zealand and Sweden. They have 7 pupils or fewer per computer in secondary

BOX 3.2 **EXAMPLES OF AGREEMENT BETWEEN SCHOOL AUTHORITIES AND TELECOMMUNICATIONS COMPANIES ON DISCOUNTS OF TELECOMMUNICATIONS COSTS**

Several OECD countries have negotiated agreements with telecommunication companies in order to obtain discounted rates for schools and in some cases also for libraries.

Belgium: Agreement between the authorities and Belgacom, which offers unlimited communication on the Internet for US$518 per year per school. An additional agreement was negotiated by the Ministry of the Flemish Community with Telenet, another telecommunications operator.

France: Agreement with France Telecom for unlimited school access to the Internet, at a discounted rate of US$135.50 per year per communication line. Other discounts are also available.

Ireland: Telecom Eireann, the leading Irish telecommunications company, is investing US$19.9 million in Schools IT 2000 in partnership with the Department of Education and Science (DES) to provide free installation of telephone lines, one multimedia Internet-ready computer to every school and, for two years, free rental of telephone lines and one hour per school day free usage of the line to connect to the Internet. Every school is now connected to the Internet.

United Kingdom: Industry has been invited to provide "managed services" to schools, by supplying, maintaining and renewing ICT networks (on a local or national basis). Schools can connect to the Internet free of charge.

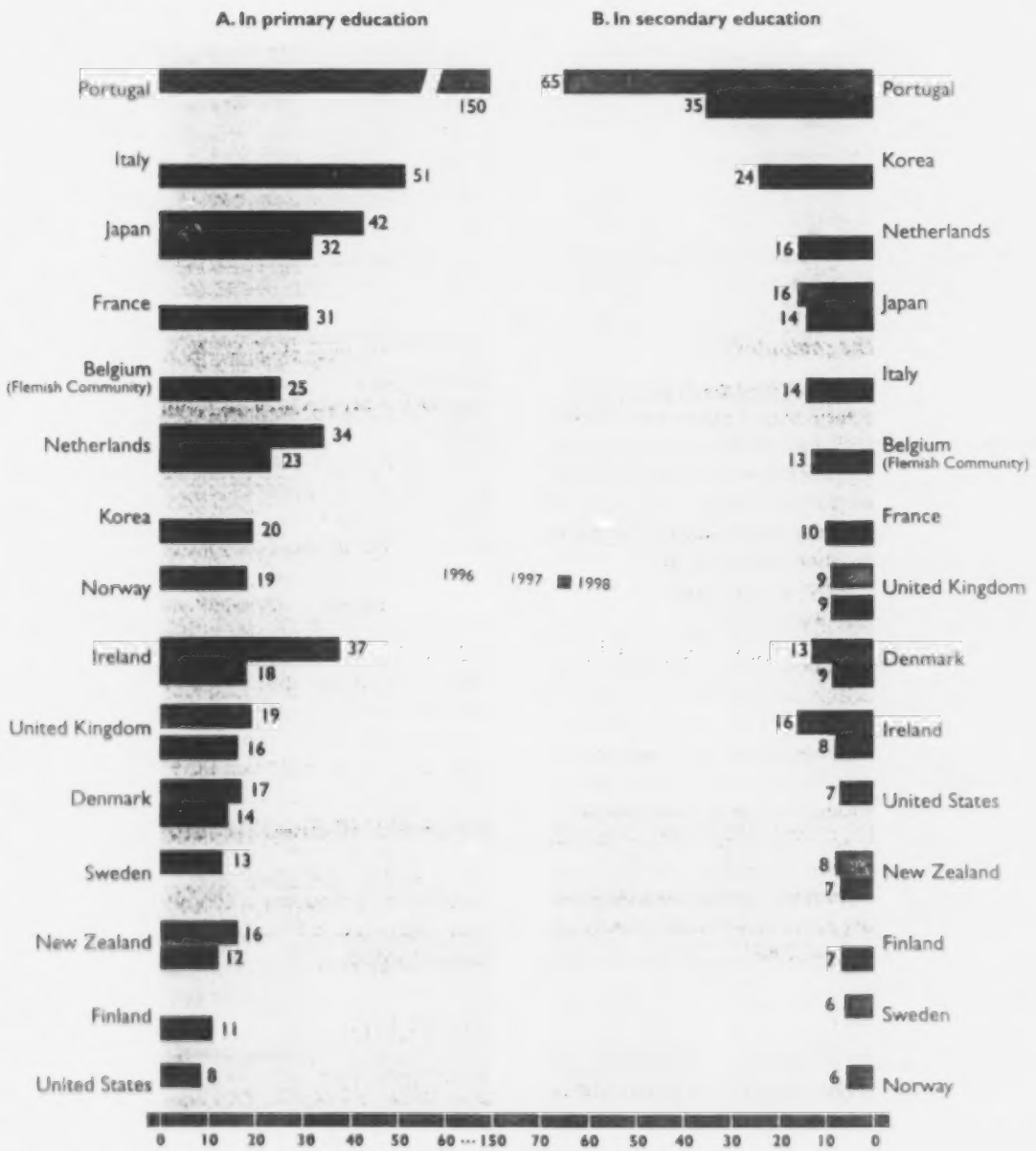
United States: Schools and libraries benefit from 20 to 90% discounts on telecommunications services, depending on their school district's wealth. Funding of US$1.66 billion for the first eighteen months of the "E-rates" awards was used to reduce the costs of telecommunication services, Internet access and classroom wiring.

education and 13 in primary education. The United Kingdom, Denmark, Ireland and Norway have good access to ICT, with less than 10 pupils per computer at the secondary level and less than 20 at the primary level. France, Belgium, Korea, Italy, Japan and the Netherlands are less ICT-intensive in education, and Portugal has the lowest access levels. But Portugal has a strong explicit strategy to increase access and use of ICT.

It is clear from Figure 3.2 that overall, computer intensity is greater in secondary than in primary education. A notable near-exception is the United States, where computers in primary schools are at least twice as common as in most other countries, and nearly as common as in U.S. secondary schools. At the other extreme, Norway, France and Italy have at least three times as many pupils per computer in primary as in secondary school.

There are several possible explanations for this pattern. First, some education systems in OECD countries might consider it premature to introduce ICT in teaching in primary education, so computers are mainly used by administrators and teachers. Second, equipping secondary schools with computers or upgrading those computers may appear more urgent, and the number of primary school pupils per computer is likely to fall rapidly once secondary schools are properly equipped. Third, different funding sources may help direct ICT more to secondary schools. For example, in France, the central government accounts for most funding of secondary education, and may put more emphasis on computers.

Figure 3.2
Number of students per computer



Some countries now have an average of two or more computers per group of 30 children in primary schools; in secondary schools there are typically between two and five computers per 30 children.

Countries are ranked in descending order of students per computer, most recent year.

Source: OECD Secretariat, from country-based data.

Data for Figure 3.2, page 90

BEST COPY AVAILABLE

Table 3.1
Percentage of computers with multimedia capacity, 1998

	Primary and secondary	Primary only	Secondary only
United States	47%		
Sweden		52%	38%
Netherlands		69%	89%
Norway[1]		20%	11%
France		33%	23%

1. 1997.
Sources: OECD Secretariat, from country-based data supplied by Ministries of Education and, for the United States, Market Data Retrieval (1998).

How good are the computers?

The age and quality of computers in schools is crucial: only if they have sound cards and CD-ROM drives, for example, can students use up-to-date and efficient educational multimedia software including access to the Internet. Data on the proportion that have this multimedia capacity[3] are only available in some countries, but show that despite rapid progress, a large number are out of date in this sense (Table 3.1).

Primary school computers are more likely to be multimedia, probably because the equipment of this sector has on average been more recent. Older computers have not generally been upgraded to multimedia capabilities. So the quantitatively superior hardware stock of secondary education is also relatively old. This helps explain why for example in the United Kingdom, hardware purchase remains a stated priority for secondary, but less so for primary education (British Educational Suppliers Association, 1998).

Computer location

Students (as well as teachers) have most ready access to computers when they are located in their classrooms and least access if they are locked in offices. Those in computer rooms and libraries give a certain amount of access, but only within constraints of schedules and other rigidities. Teachers have additional access to computers when they are located in the staff room. So access to computers is closely linked to location.

Most schools have their computers in computer laboratories. At the secondary level, 70% of the computers are located in computer rooms in Sweden in 1997, versus 24% in classrooms (Swedish National Agency for Education, 1998). In France, where a precise location study has been carried out, only 4.9% of the computers are placed in classrooms in secondary schools and 28.3% in primary (Internal note from the French Ministry of National Education, Research and Technology).

But, if it is most common to choose a centralised solution when computers are relatively scarce, greater investment is allowing more to go to classrooms. In the United States, for the first time in 1998, there were more computers in classrooms (49.7%) than in computer laboratories (41.1%) or in libraries (7.6%) (Market Data Retrieval, 1998).

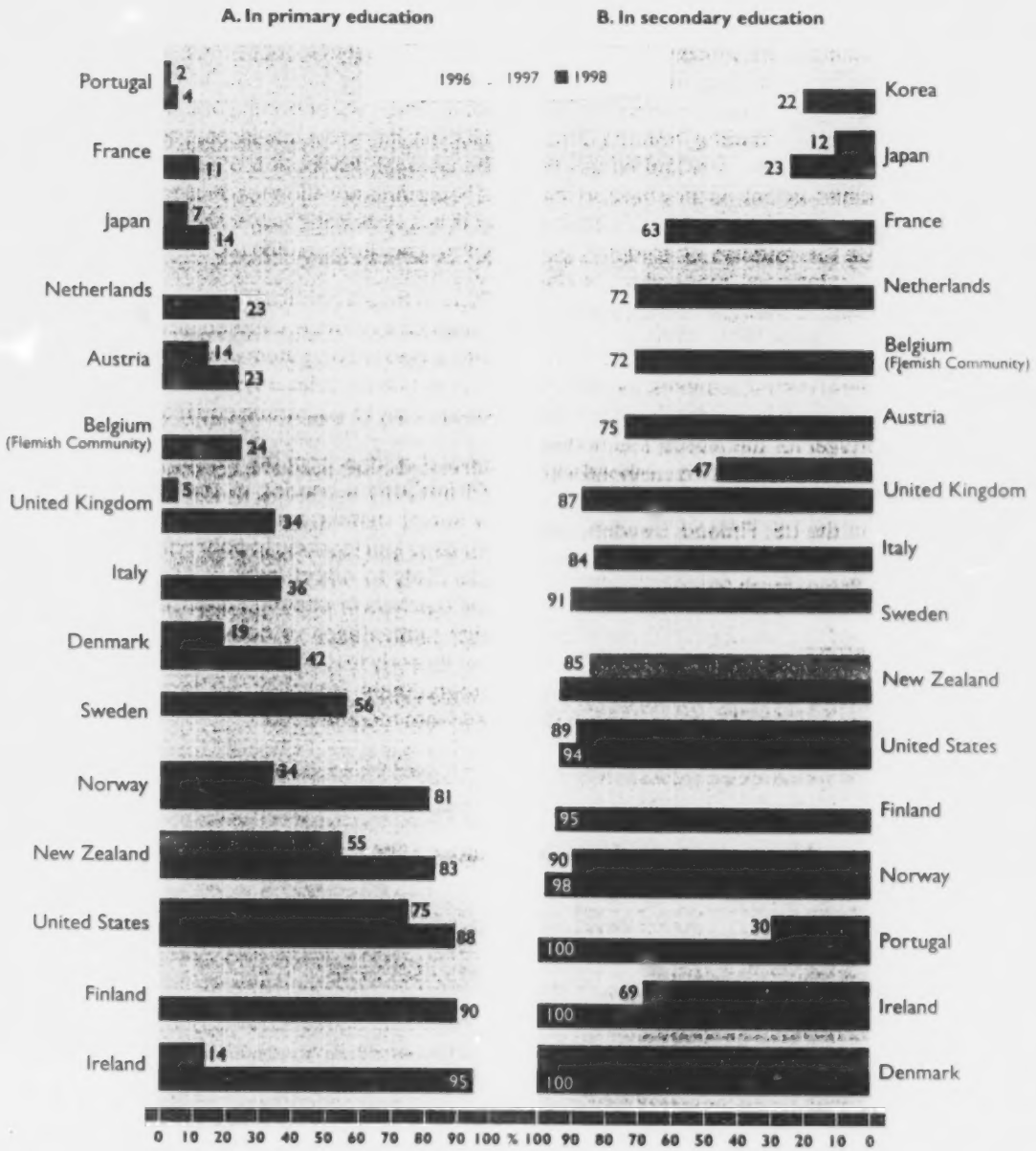
The international data show that the great majority of computers in schools are accessible to students rather than being used for administrative purposes.

Internet access

Connecting schools to the Internet has in the past three to four years become a high priority in most OECD countries. Figure 3.3 shows for some countries a spectacular growth in the percentage of schools connected both in primary and

3. Multimedia capacity is, however, not necessarily a good measure of the capabilities of the computer. A better measure would take into account processor type and speed in addition to sound card and CD-ROM capabilities.

Figure 3.3
Percentage of schools connected to the Internet



The great majority of secondary schools, and growing numbers of primary schools, are now connected to the Internet. In some countries the majority of schools became connected within a single year.

Countries are ranked in ascending order of percentage of schools connected to the Internet, most recent year.

Source: OECD Secretariat, from country-based data
Data for Figure 3.3, page 90

BEST COPY AVAILABLE

secondary education: in some cases the majority became connected in the space of a single year. However, this indicator can be misleading. For example, a school with only one connection, and that connection being in the principal's office, will be counted as being connected. All Portuguese secondary schools have been connected to the Internet with the help of funding from the European Commission. But this is of limited use to Portuguese students as long as they have so few computers in their schools. A better indicator of access would be the number of students per computer with an Internet connection, or the percentage of students having an e-mail address.

Connection of secondary schools is tending towards the universal in most countries; for primary schools access remains more patchy. With the exception of Portugal for the reason mentioned, low access to the Internet tends to correspond with low computer availability as shown in Figure 3.2. Again, schools in the US, Finland, Sweden, and New Zealand are well served, and schools in Japan, Korea, Italy and France much less so.

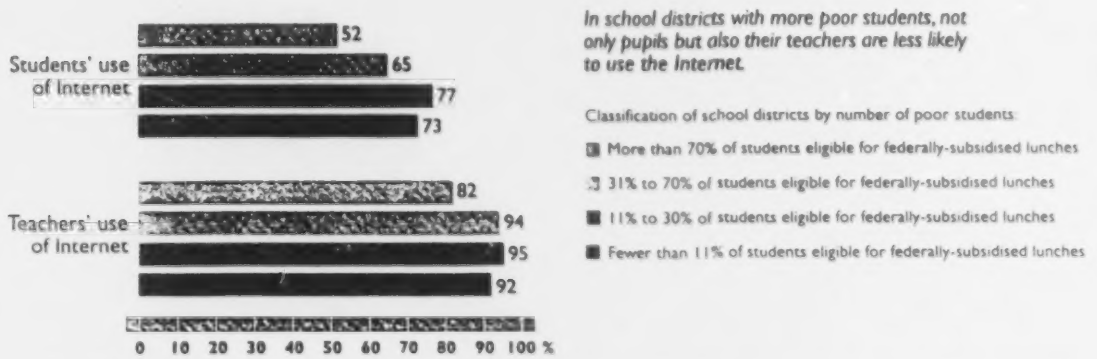
Inequalities in access

Several studies have shown that the computer diffusion rates are correlated both to household income and to educational level of the householder (see, for example, OECD, 1997). Children's access to computers at home is therefore influenced by their parents' socio-economic status. The importance of "learning by doing" for mastering ICT gives an advantage to pupils who have access to ICT at home. The costs of owning and using ICT remain relatively high for a low-income family. Moreover, the unequal distribution of access to computers at home does not allow teachers to give ICT homework in a systematic way, making extensive use of ICT in schools more difficult.

There is thus a political pressure in many OECD countries to provide children from poor families with access to computers in schools and libraries. Even within the school system, it is, however, not always easy to guarantee equal access.

Several studies from the US show differences in ICT-intensity according to the schools' cultural or social demography. Figure 3.4 shows that students and teachers in poor school districts are less likely to report Internet use than students and teachers in wealthier districts. Districts with high percentages of non-white students have significantly less access to ICT. Many of the U.S. programmes, however, are targeted on those students most in need.

Figure 3.4
School poverty and Internet use in the United States, 1996


Students' use of Internet
52
65
77
73
Teachers' use of Internet
82
94
95
92
0 10 20 30 40 50 60 70 80 90 100 %
In school districts with more poor students, not only pupils but also their teachers are less likely to use the Internet.
Classification of school districts by number of poor students:
More than 70% of students eligible for federally-subsidised lunches
31% to 70% of students eligible for federally-subsidised lunches
11% to 30% of students eligible for federally-subsidised lunches
Fewer than 11% of students eligible for federally-subsidised lunches

Source: U.S. Department of Education, unpublished tabulations from "Advanced Telecommunications in U.S. Public Schools Survey".
Data for Figure 3.4, page 91.

The same phenomenon is observed for computers, multimedia computers and the Internet (Market Data Retrieval, 1998; Quality Education Data, 1998*b* and 1998*c*). It is to be noted, however, that all schools have increased their level of access to ICT and children in disadvantaged U.S. schools have more access to ICT than the great majority of schools in other OECD countries.

In Australia, access to ICT can pose special problems for students from rural and remote areas. The Commonwealth government currently funds an educational community access pilot project in rural areas and areas of socio-economic disadvantage to ensure that all members of the educational community have access to, and understanding of, the uses of technology in education.

In France, the government has established a programme of "positive discrimination", granting to schools addressing particular social and academic difficulties more resources in staff and material. Priority Education Areas (ZEPs) cover 1.3 million mainly primary and lower-secondary school pupils in areas of socio-economic disadvantage. Lower secondary schools in the programme often give better access to ICT than their richer counterparts, in terms of pupils per computer and Internet connectivity. But the "ZEP-effect" is less direct in primary education. Moreover students in vocational secondary schools, with an above average attendance by poor students, have less access to ICT than pupils in general and technical secondary schools (Internal note from the French Ministry of National Education, Research and Technology).

In Italy, a survey carried out by the *Biblioteca Software Diddatico* shows that the number of students per computer is higher in southern Italy, than in the richer central and northern regions. In Portugal, there appears to be better access to ICT in urban than in rural areas, according to the Ministry of Education.

Even where schools do not provide poorer students with equal access to ICT, they generally help correct for the much more unequal access that exists at home. It is vital to monitor closely the degree to which they do so: there is a need to know more about these inequalities in access to ICT in education.

4. USE OF ICT IN EDUCATION

Students and teachers must not only have access to learning technologies; they must also be able to use them. Information about how teachers and students use technology has hitherto been sparse, especially at an international comparative level. However, the Second Information Technology in Education Study (SITES), organised by the International Association for the Evaluation of Educational Achievement (IEA) will in 1999 publish data on access and use of ICT in education in about 30 countries. Also the OECD Programme for International Student Assessment (PISA) will in 2001 provide international comparative data on the use of ICT in education in OECD countries and some major non-OECD countries. The latest presently available data on students' frequency of computer use at home, school or anywhere else in their final year of secondary school, shown in Figure 3.5, are from 1995. In the Czech Republic, Hungary, Italy and Norway, the majority of final-year secondary students reported that they rarely or never used a computer. By contrast, more than one in four students in their final secondary year in Australia, Canada, Denmark, Iceland, the Netherlands, New Zealand, Switzerland and the United States reported using a computer daily.

The actual impact of using a computer can have highly variable outcomes depending, for example, on how teachers use computers. A U.S. study found that the way teachers use computers had a larger effect on mathematics scores than how often students used them, or even whether teachers were trained in using them (Wenglinsky, 1998). Eighth graders scored higher in mathematics if their teachers used computers primarily for simulations and applications, and lower if they used them for drill-and-practice. What matters most, this suggests, is not the machines but what teachers and students do with them. However, one should be cautious about generalising the results from a single study in one subject; the data might look different in other subjects than mathematics and in other country contexts.[4]

4. See, also, Black and Atken (1996) for an assessment of curricula and teaching in science, mathematics and technology.

Figure 3.5 **Students' computer use, 1995**
Frequency of computer use at home, school or anywhere else by students in their final year of secondary school

Source: International Association for the Evaluation of Educational Achievement, Third International Mathematics and Science Study (IEA/TIMSS), 1994-95.
Data for Figure 3.5, page 91

Teacher ICT *training*

There is no doubt that the role of teachers is central in making progress in the use of ICT in schools. Teachers need opportunities to discover what the technologies can do. Both pre-service and in-service training of teachers in the use of learning technologies is very important. The neglect of teacher ICT training, which tends to lag behind physical investment, is often considered a major obstacle (see OECD, 1998*b* and 1998*c*; see also Box 3.3). In the United States, it is remarkable that expenditures on technology training for instructional staff increased only slightly from 4% of the technology budget in 1994-95 to 5% in 1998-99,[5] given the high political priority of the use of ICT in education and the fact that many teachers lack ICT skills.

Several studies have shown that an important barrier to technology use in schools is simply lack of teacher time to attend training and workshops, and to plan lessons using new materials or methods. Another important factor is the lack of learning technology plans, which engage the whole of a school's teaching staff. Many of the innovations in using learning technologies still rely on individual teachers, and their knowledge is often not disseminated widely in the school or to other schools (see, for example, OECD, 1998*b* and 1998*c*).

Software quality

One reason why teachers might be reluctant to use ICT in their teaching on a larger scale could be the lack of quality educational software. This lack tends to be greatest in countries where there is little quality software in the native language. This is now seen as a generic problem that could very well delay the benefits of the US$16 billion investment in ICT to improve learning opportunities in education in OECD countries. Private developers see the educational multimedia software market as a relatively small and insecure market compared with other software markets. A critical mass is needed for further development of educational multimedia software. Well functioning public-private partnerships and a clearer strategy from schools and governments in the use of educational software are important to overcome these market obstacles. Better collaboration could bring advantages for both the schools and the private providers in ensuring higher quality of educational multimedia products, more versatile learning opportunities in schools, and a greater market. Several OECD governments do offer seed money for research in learning technologies and

5. Software & Information Industry Association (1999*b*). Many initiatives to address the need for technology training for teachers are sponsored by the federal government and the non-profit and private sectors. Expenditures measured at the school- or district- level may not capture all of these training opportunities.

BOX 3.3 **TIME SPENT ON TEACHER ICT TRAINING**

In **Ireland**, teachers are offered a minimum of 20 hours of ICT-training per year (Internal note from the Department of Education and Science, Government of Ireland).

Since 1996, **Finland** has supported a five-week training for teachers, on which 5 500 out of the 60 000 Finnish teachers have already started. The training gives pedagogical skills in using ICT and in training other teachers at a local level (Finnish Ministry of Education and Science, 1995).

In **New Zealand**, principals reported that during the year 1997, 58% of teachers attended ICT courses in primary, and 33% in secondary. Moreover, teachers in primary have attended longer training programmes than in secondary education. Of schools reporting, the most common length of time was less than 8 hours for 87% of the teachers in secondary schools and 67% in primary schools, whereas it was more than 8 hours for 13% of the teachers in secondary schools and 33% in primary schools (based on Information Technology Advisory Group, 1998).

In the **United States**, 36% of the schools in 1997-98 offer no technology training to teachers, 29% of schools offer teachers between 1 and 14 hours of technology training, and 35% offer 15 or more hours per year. On average, schools reported 21 hours of technology training provided to teachers, when all sources of training are taken into account (Market Data Retrieval, 1998).

for product development. This has stimulated private-public partnerships but the communication between researchers/teachers and private developers has often been limited. The result is potentially very promising educational software may never get to the market because of poor timing or little understanding of the education world.

National organisations in some OECD countries have set up guidelines for evaluating educational software and have instituted a clearing house to conduct and disseminate analyses and evaluations of software.[6] This might have a positive effect on the quality of educational software used in schools, as it gives guidelines or a minimum quality standard for products developed by educational multimedia software companies.

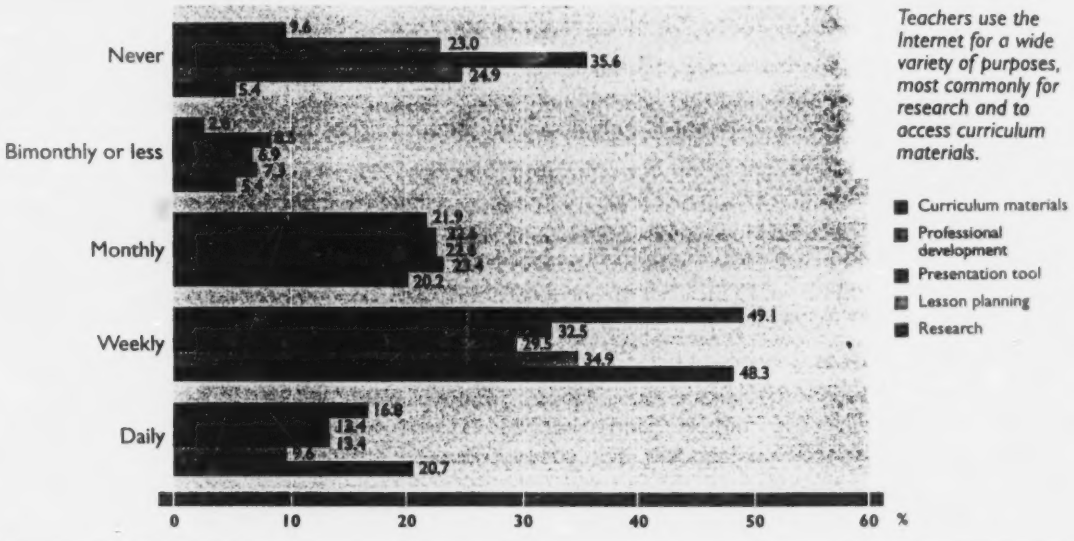
Teacher and student usage of computers, including the Internet

Despite the obstacles of using ICT in education, the use of computers including the Internet is increasing considerably. For example, the number of teachers in US primary and secondary schools using the Internet in teaching rose from 47.8% in 1997 to 65.2% in 1998 (Quality Education Data, 1998*b*). The following country examples give a picture of many teachers using computers for instructional planning and/or teaching, but a substantial number still not using computers at all in their work.

- In France, a survey by *Le Monde de l'Education* and Microsoft (*Le Monde de l'Education*, 1998) found that in 1998 43% of teachers used multimedia on a regular basis to prepare their courses, 17% regularly used ICT for pedagogical purposes and 13% regularly used multimedia in instruction. Though relatively low, the figures may still overestimate actual use since those familiar with multimedia were more likely to be survey respondents.
- In England, 81% of teachers of primary schools and 36% of teachers of secondary schools use a computer at least twice a week. There has been an increase of 4% since 1997 at the primary level, but only 0.5% at the secondary level (Internal note from the Department for Education and Employment, United Kingdom).

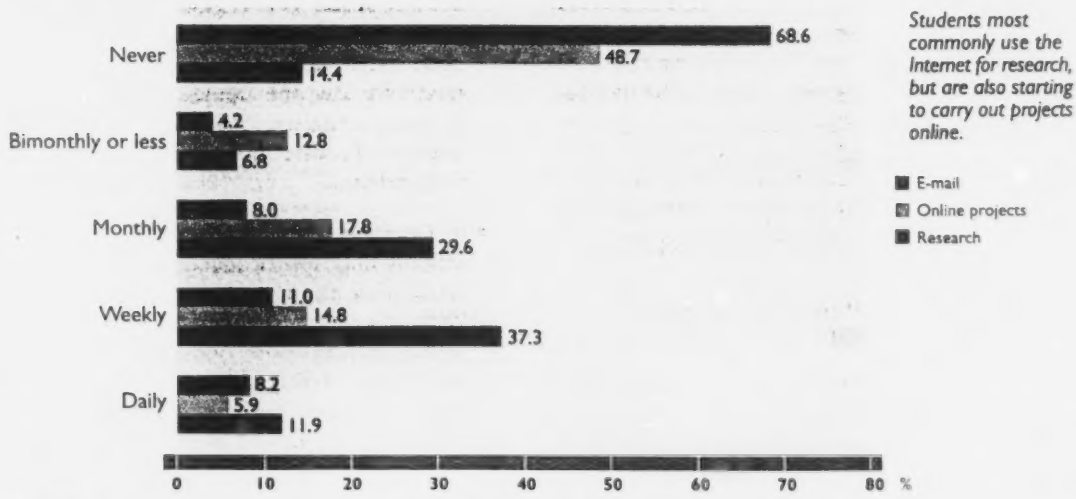
6. Examples of such organisations are Teachers Evaluating Educational Multimedia (TEEM) in the UK (www.teem.org.uk) and California Instructional Technology Clearinghouse (www.clearinghouse.K12.ca.us).

Figure 3.6
Teachers' Internet use in the United States, 1998
Percentage of teachers who say they use the Internet for instructional applications, by frequency



Source: Quality Education Data (1998b), *Internet Usage in Public Schools 1998*, 3rd edition
Data for Figure 3.6, page 91

Figure 3.7
Students' Internet use in the United States, 1998
Percentage of teachers who say their students use the Internet for classroom applications, by frequency



Source: Quality Education Data (1998b), *Internet Usage in Public Schools 1998*, 3rd edition
Data for Figure 3.7, page 91

- In the United States, 23.1% of schools in 1997-98 reported that almost all of their teachers use computers on a daily basis for instructional planning and/or teaching, but 22.3% reported that none of their teachers use a computer daily. 37.2% of schools claim that at least 60% of their teachers use a computer daily, and 53.8%, that at least 30% of their teachers use a computer daily (Market Data Retrieval, 1998).

Figure 3.6 shows teacher Internet usage for instructional applications by frequency in U.S. primary and secondary schools. One in five teachers use the Internet daily for research and more than half do research and access curriculum materials on the Internet at least every week. Many teachers also use the Internet for lesson planning, professional development and as a presentation tool for classroom instruction.

Figure 3.7 shows the rate of student Internet usage for classroom applications in U.S. primary and secondary schools. Compared with the teachers, the students' usage of the Internet is more limited. In 11.9% of schools, students use the Internet for research daily. Research is the most popular use of the Internet followed by online projects and then e-mail use.

While these data suggest that teachers use the Internet more extensively than students, there are many examples showing that students in upper secondary and to some extent also in lower secondary education are far more advanced users of the Internet than their teachers are. Some of the teachers are taking advantage of the Internet skills of their students, who act as consultants whenever it is relevant to use the Internet for teaching. In this way, the introduction of ICT in schools can contribute to a more demand-led teaching process.

5. CONCLUSIONS

Both the pace of development and the spread of ICT in schools and homes as well as at work sites and other settings recast longstanding issues of access and quality in education and raise new ones in such rapidly evolving portfolios as telecommunications. Attention will need to be given to many of the key policy issues mentioned below.[7]

A first and central issue is *finance*. It is not simply a matter of a one-off investment. Maintaining and updating fast-changing technology and software creates ongoing costs, implying a fundamental redirection of education funds. In U.S. schools, ICT spending has overtaken the expenditures of print material. The question is what should the new distribution of the education spend look like? How much should be allocated to the acquisition of content compared to technology, and how much on ICT compared to traditional expenditure such as teacher salaries, training, school buildings, books and materials. With so far not more than 1-2% of school budgets going to ICT, the toughest decisions may still lie ahead.

Can technology investment bring significant cost savings elsewhere? Experiences to date have tended to show the opposite. Yet if efficient exploitation of ICT can be achieved, bringing in new educational content, some studies show there are good opportunities for cost benefits resulting from a more effective delivery of education. Given the funding crisis in education and the immense pressure on education authorities to manage spending as efficiently as possible, there are uncertainties as to whether there will be extra funds available for expensive creation and supply of educational software and multimedia, let alone the funds to update software and hardware required for a state of the art infrastructure. So more adequate levels of recurring expenditure on ICT may need to go hand in hand with savings elsewhere.

A second, related issue is the priority given to *software development*. Countries and schools, which have invested heavily in hardware and infrastructure, might consider switching a larger part of their educational technology spending on educational multimedia software and teacher

7. The OECD's Centre for Educational Research and Innovation in its new project on "ICT and the Quality of Learning" will address a number of issues on software quality, the private market and partnerships and the impact of ICT in learning.

training. Every OECD country is grappling with similar political concerns about the regulation, funding, implementation and management of the educational sector. New issues are raised by the production and delivery of educational content over mixed-media global networks. Tertiary education institutions face a serious challenge from emerging Internet education and training companies, most particularly in the provision of open and flexible learning options. In many countries, schools and colleges have traditionally followed guidelines and curriculum requirements to secure the quality and standards of the education provided. Curricula and learning materials are often highly regulated. Norway, for instance, requires all materials to be officially approved by a government agency before being used in the schools. In other countries such as the US where government intervention is less extensive, there is nevertheless strong involvement of educational authorities to identify and encourage the use of high quality learning materials.

While policy will vary from nation to nation and from sector to sector, no existing policy deals with the fact that learning materials and educational services are no longer limited to the classroom and the purchase of printed material. How should the Internet and other communication networks be dealt with in different learning environments? What is the role of software and multimedia in relation to traditional means of learning? How can quality assurance be developed and implemented to accommodate a mixed-media open-learning environment? Who is responsible for supplying what?

So a third issue is the need for *regulatory frameworks*, which affect the supply of educational software and multimedia, for example via intensified public/private partnerships. This is complicated because such frameworks straddle several different types of legal regimes: taxation, contract law, Intellectual Property Rights (IPR), security, privacy, data protection, consumer rights and industry regulation. To illustrate the complexity, should educational software and multimedia be subject to value added tax or should electronic media, like print, be tax exempt or lower taxed? Should there be any copyright exemption rules extended to educational use of electronic media? How will IPR be protected and managed? If digital content and software transactions are to be encrypted, how does that fit with national security laws? Educational software may track and record the individual's performance and information usage; what impact does that have on the individual's right to privacy and on how data-protection rules are applied? How should "essential services" or "universal access" be defined in a mixed-media market, and what about equity in terms of access to education and knowledge?

Furthermore, the issue arises of whether all such regulation should be at a national level, or what may belong at an international level? Education remains a process deeply rooted in national culture and language. How can nations protect their local identity, language and culture in this emerging market from dominance of Anglo-American content, supply and technology investment?

Fourth is the issue of whether the Internet can broaden the way educational material is delivered and used, in ways that reinforce *lifelong learning*, but without sacrificing quality. More individualised, demand-led supply of learning and learning material is possible, not only in tertiary and adult education, but also increasingly in primary and secondary education. The traditional highly regulated supply-led schoolbook market is under increasing pressure by these developments. But how in this context can the quality of learning material in schools be maintained? The private demand-led supply of learning material in and outside schools might imply a rising demand to establish some kind of "consumer" or "learner" protection especially for the lower grades in schools.

Education authorities cannot deal with these issues on their own. Collaboration within the public sector, and between the public and private sectors on a national, and in some cases, on an international scale is bound to be a way forward. The UK Government has introduced the notion of "joined up government" to improve and integrate communications and operational processes across separate government departments and agencies. Other nations are developing similar constructive responses.

The biggest challenge for these partnerships will be to develop a new, functional know-how around educational ICT. Skills are at a premium: unlike the corporate sector, schools and colleges do not have professional ICT departments with around-the-clock support and help desks. Neither do they have the training budgets to send librarians, teachers or parents on frequent courses to update their ICT skills. Authors, publishers and broadcasters need to move up the learning curve and acquire new skills to permit the supply of educational software and multimedia. Users – students and teachers – need to adapt to new ways of learning and develop skills to master complex resources and communication processes. Finally, there is a skill deficit when it comes to the management and control of the evolving education market. Those who recruit, manage and train staff within schools' authorities and schools need to focus on the effective management of the growing investment in educational multimedia content and services. ■

References

The Internet offers a rich source of information on ICT and its uses. A listing of a number of those sites and additional information can be obtained from the home page of the Centre for Educational Research and Innovation, found at the OECD web site: www.oecd.org/els/edu/ceri/index.htm

BECKER, H. J. (1998), *Internet Use by Teachers: Conditions and Professional Use and Teacher-Directed Student Use*, University of California at Irvine and University of Minnesota.

BIBLIOTECA SOFTWARE DIDDATICO (1998), *Scuola Secondaria Superiore: Pre-Inchiesta sulla Dotazione Di Comptuer e l'uso di Software*, Genova.

BLACK, P. and **ATKEN, M.** (1996), *Changing the Subject: Innovations in Science, Mathematics and Technology Education*, OECD and Routledge, Paris and London.

BRITISH EDUCATIONAL COMMUNICATIONS AND TECHNOLOGY AGENCY (1998), *Connecting Schools, Networking People* – ICT *Planning, Purchasing and Good Practice for the National Grid for Learning*, London.

BRITISH EDUCATIONAL SUPPLIERS ASSOCIATION (1998), *Information and Communications Technology in UK Schools 1998*, London.

BRITISH EDUCATIONAL SUPPLIERS ASSOCIATION (1999), *UK Schools Survey on Budget and Resource Provision, 1999 Edition*, London.

DANISH MINISTRY OF EDUCATION (1998), *Information and Communication Technologies in the Education System, Action Plan for 1998-2003*, Copenhagen.

EDUCATION MARKET RESEARCH (1999), *The Complete K-12 Report: Market Facts & Segment Analyses*, Education Market Research & Open Book Publishing, Darien, CT.

EUROPEAN EXPERTS' NETWORK FOR EDUCATIONAL TECHNOLOGY (EENET) (1998), *How Learning is Changing: Information and Information Technology across Europe (ICT in education policy)*.

EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES (1997), *Report to the President on the Use of Technology to Strengthen K-12 Education in the United States*, Washington, D.C.

FINNISH MINISTRY OF EDUCATION AND SCIENCE (1995), *Education, Training and Research in the Information Society: A National Strategy*, Helsinki.

INFORMATION TECHNOLOGY ADVISORY GROUP (1998), *Towards 2001 – Information and Communications Technology in New Zealand Schools 1993-98*, Wellington.

LEER, A. (Ed.) (1999), *Masters of the Wired World*, Pitman Publishing, London.

LE MONDE DE L'EDUCATION (1998), "Survey Sofres-Le Monde de l'Education-Microsoft", Paris.

MARKET DATA RETRIEVAL (1998), *Technology in Education*, Shelton, Connecticut.

MULTIMEDIA EDUCATIONAL SOFTWARE OBSERVATORY (1998), *Final Report*, Vol. 1: "European Overview".

NATIONAL GRID FOR LEARNING (1997), *Connecting the Learning Society*, London.

BEST COPY AVAILABLE

OECD (1989), *Information Technologies in Education – The Quest for Quality Software*, Paris.

OECD (1997), "Demand for Internet-based Services: Education, Business Services and Entertainment", document, Paris.

OECD (1998*a*), "New Developments in Educational Software and Multi-Media", document, Paris.

OECD (1998*b*), *Education at a Glance*: OECD Indicators 1998, Paris.

OECD (1998*c*), *Education Policy Analysis* 1998, Paris.

OECD (1998*d*), *Staying Ahead*: In-service Training and Teacher Professional Development, Paris.

PORTUGUESE MINISTRY OF EDUCATION (1997), *Programa Nonio Seculo XXI, Inquerito Nacional "As technologias de Informação e comunição nas escolas"*, DAPP, Lisbon.

QUALITY EDUCATION DATA (1998*a*), 1998-99 *Technology Purchasing Forecast*, Denver, Colorado.

QUALITY EDUCATION DATA (1998*b*), *Internet Usage in Public Schools* 1998, 3rd Edition, Denver, Colorado.

QUALITY EDUCATION DATA (1998*c*), *Technology in Public Schools*, 16th Edition, Denver, Colorado.

ROYAL MINISTRY OF EDUCATION, RESEARCH AND CHURCH AFFAIRS (1995), IT *in Norwegian Education*: A Plan for 1996-1999, Oslo.

SOFTWARE & INFORMATION INDUSTRY ASSOCIATION (1999*a*), 1999 *Research Report on the Effectiveness of Technology in Schools*, 6th Edition, Washington, D.C.

SOFTWARE & INFORMATION INDUSTRY ASSOCIATION (1999*b*), *Education Market Report*: K-12, Washington, D.C.

SOFTWARE PUBLISHERS ASSOCIATION (1998*a*), *Education Market Report*: K-12, Washington, D.C.

SOFTWARE PUBLISHERS ASSOCIATION (1998*b*), *Education Market Report*: Post-Secondary, Washington, D.C.

SWEDISH MINISTRY OF EDUCATION AND SCIENCE (Regeringskansliet) (199x), *Tools for Learning*: A National Program for ICT in Schools, Stockholm.

SWEDISH NATIONAL AGENCY FOR EDUCATION (Skolverkets) (1997), *Skolans datorer* 1997 – *en kvantitativ bild*-Rapport n°147, Stockholm.

TECHNOLOGICAL HORIZONS IN EDUCATION (THE), *Report* 1998, Tustin, California.

THE RESEARCH MACHINE (1999), G7 *Report* 1998: ICT Provision in Schools, Oxfordshire.

WENGLINSKY, H. (1998), "Does it Compute? The Relationship between Educational Technology and Student Achievement in Mathematics", ETS *Policy Information Report*, Princeton.

CHAPTER 4

TERTIARY EDUCATION: Extending the benefits of growth to new groups

Summary

Enrolments in tertiary education rose by an average of 40% in the first six years of the 1990s. This growth has been largely driven by rising rates of youth participation; demography has had a mainly neutral effect. The growth represents an achievement in meeting new demand, but also a challenge in providing for still more demand, from students from a range of backgrounds and from adults of all ages.

The expansion has not on the whole reduced disparities in access to tertiary education for people from different backgrounds: the extra places have been taken up at least as much by children from more privileged socio-economic groups as by others. Countries that wish to improve such access are therefore having to make conscious and sustained efforts to help prepare and assist all students rather than assuming that the creation of more places will be sufficient.

Increasing numbers of students are not at the "traditional" age of late teens or early 20s. There has been strong growth in participation of those in their late 20s, partly because studies are taking longer to complete for various reasons. But in addition, a growing number are entering tertiary education in mature adulthood, either having missed out when they were young ("second chancers") or coming back for more ("second biters"). An indication of this phenomenon is the rate at which people over 30 who are eligible for tertiary education (holding upper secondary qualifications) engage in various types of study. These participation rates vary greatly among countries, but up to 8% of qualified adults are enrolled in full or part-time courses for tertiary-level qualifications, and up to 18% take some course with a tertiary institution during a year. These levels show that the assumption that tertiary education is primarily for the young should be seriously questioned.

How well are tertiary institutions catering for more diverse populations? Alternatives to universities have grown steadily over the years, but show no sign of taking over: in many countries university enrolments have expanded faster than non-university ones in the 1990s. Women are gradually becoming more numerous in areas of study where they have been under-represented, and also in post-graduate studies.

But access can also depend on the distribution of financial and educational resources, which remains uneven between social groups. Even where student aid is targeted to poorer families, overall spending on educating better-off students can be greater because they participate disproportionately in higher-status, more expensive courses.

Nevertheless, tertiary education is making efforts to re-orient itself towards greater inclusiveness rather than just picking elites. This ongoing task entails not just raising student numbers, but adopting teaching, financing and student support strategies that cater for a heterogeneous clientele.

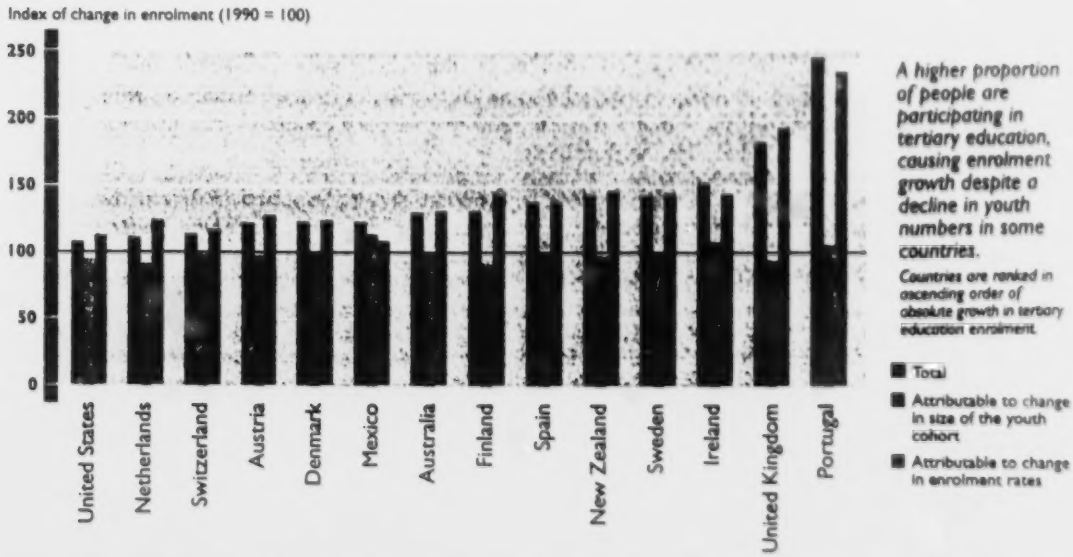
1. INTRODUCTION

A marked feature of development in tertiary education in OECD countries has been expansion to large volume participation. As shown in Figure 4.1, recent rates of increase in headcount enrolment have been substantial: over the six years to 1996, there was a 40% increase in fifteen OECD countries for which comparative trend data are available. Among these countries, growth has been lowest in the United States. Elsewhere, in countries that started from lower rates of participation than the United States, the growth is dramatic: up 22% in Mexico, 29% in Australia, 30% in Finland, 37% in Spain, 41% in Sweden and New Zealand, 51% in Ireland, 81% in the United Kingdom and 144% in Portugal.

Although demographic developments can affect enrolment numbers (through changes in the size of the relevant age group), the more important influences in the 1990s have been educational (increased retention through full secondary education), cultural (increased expectations, as tertiary education becomes "the place to be") and economic (shifts in demands toward a range of skills, knowledge and dispositions at initial and advanced tertiary levels to fill "high skill/high productivity" jobs). These influences have caused enrolments to rise sharply at a time when they would have been expected to change only slightly, up or down according to country, if demographic developments were the only influences. The growth to larger volume participation in tertiary education suggests participation from a more diverse pool of potential students.

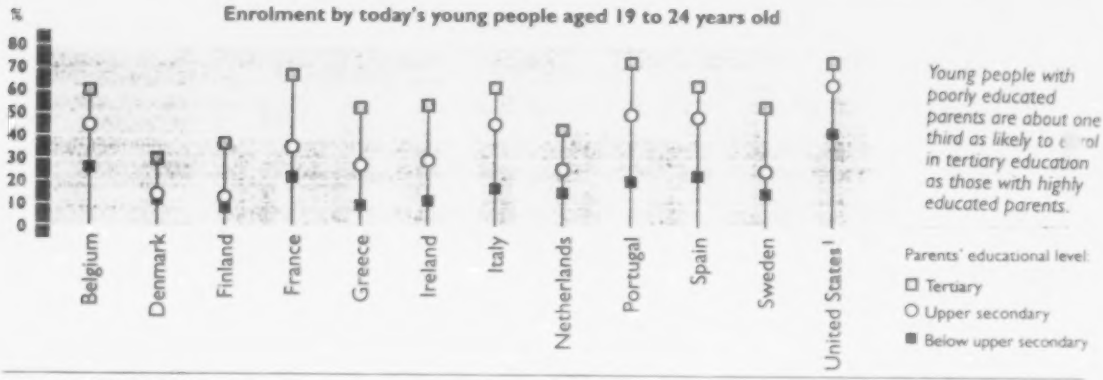
Expansion to large volume participation in tertiary education in all OECD countries stands as an important and impressive achievement, and the factors behind that growth are likely to continue to contribute to a strengthening of public as well as private motivations for even greater levels of participation in the early adult years and throughout life. As participation over a lifetime in some form of tertiary education becomes a common experience, those who do not acquire knowledge and abilities or qualifications at this level will be left further behind. So, a key issue now concerns how best to secure and extend the benefits to ever

Figure 4.1
Growth in tertiary education enrolment, 1990-96



Source: OECD Education Database
Data for Figure 4.1, page 92

Figure 4.2a
Participation in and completion of tertiary education by parents' educational level, 1994-95



1. 18 to 24 year-olds.
Sources: EURYDICE (1997); U.S. Bureau of the Census (1995).
Data for Figure 4.2a, page 92.

increasing and widening pools of potential learners. As expressed in the OECD report *Redefining Tertiary Education* " (...) the forces at play suggest a sweeping shift in orientation toward even higher levels of participation at the tertiary level (...), inevitably from previously underserved groups. Changes are occurring, and more are required to meet the educational needs of these new waves of students" (OECD, 1998c).

This chapter examines the issue in two parts: first by looking at patterns and trends of access to tertiary education, both at a young age and for participation of older adults in "second chance" or "second bite" tertiary education; secondly by considering differences in groups' access to different study options, learning resources and financial support. While groups identified as underserved will differ among countries, most countries have been concerned with persistent differences in participation by socio-economic status; with different patterns of participation in tertiary education by age; and with the position of women in tertiary education.

2. EXTENDING ACCESS

Participation from low social and economic groups

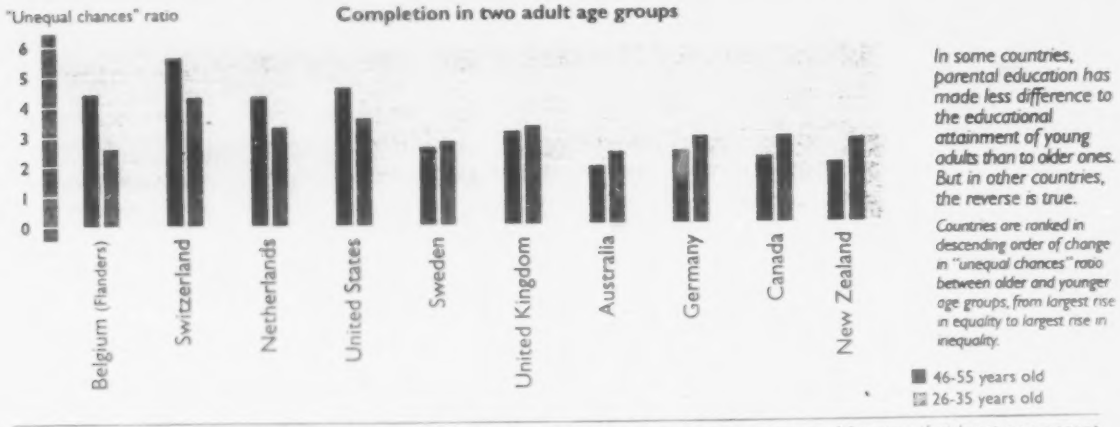
Although expansion has been advanced in several countries as a means to bring into tertiary education those who have been under-represented

BEST COPY AVAILABLE

prior patterns in the social and economic mix of students persist throughout the OECD area. As shown in Figure 4.2a, in a wide range of countries young adults from families with parents who have completed some tertiary education are at least twice as likely to participate in tertiary education as their peers from families with parents who lack secondary education qualifications. Differences among countries in the rates of participation by parent's education are partly due to educational structures (including access to advanced level education and training outside the education system), labour market conditions and arrangements and long-standing customs in the countries concerned. For whatever reason, some countries achieve a narrower gap than others in terms of participation by parental education background. Whereas in most countries for example young people with parents below upper-secondary education have about one-third the chance of participating at tertiary level as those whose parents have completed tertiary education, in Ireland and Greece they have about one-fifth the chance and in the United States and Belgium about one-half.

Are such differences diminishing over time? Figure 4.2b looks at two generations of adults in terms of how much more likely they are to have obtained a tertiary qualification if their parents were well educated, compared to if they were

Figure 4.2b
Participation in and completion of tertiary education by parents' educational level, 1994-95


"Unequal chances" ratio
Completion in two adult age groups
6
5
4
3
2
1
0
Belgium (Flanders)
Switzerland
Netherlands
United States
Sweden
United Kingdom
Australia
Germany
Canada
New Zealand
In some countries, parental education has made less difference to the educational attainment of young adults than to older ones. But in other countries, the reverse is true.
Countries are ranked in descending order of change in "unequal chances" ratio between older and younger age groups, from largest rise in equality to largest rise in inequality.
46-55 years old
26-35 years old

"Unequal chances" ratio is calculated by dividing the chance of getting a tertiary degree or qualification if at least one parent obtained one by the chance of doing so if neither parent completed secondary education.
Sources: For Germany: Socio-economic panel 1996; for all other countries: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.
Data for Figure 4.2b, page 92

poorly educated. In some countries this measure of inequality is lower in the younger cohort, indicating that differences are indeed diminishing. In others however they have increased – so there does not appear to be a common pattern of general improvement. This general conclusion as well as the patterns for individual countries shown in Figures 4.2a and 4.2b need to be read with caution, owing to difficulties in definition and measurement.[1]

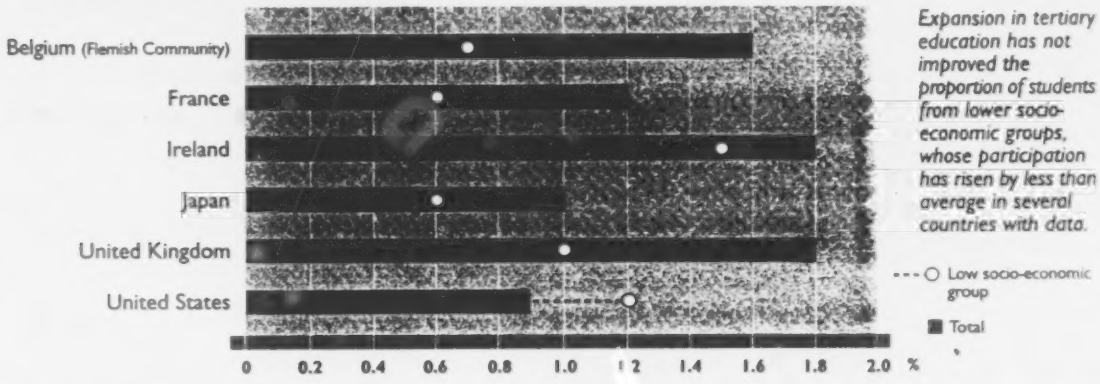
These are long-term trends. But looking more closely at the recent expansion and other changes in tertiary education, are they linked to improvements in the rates of participation of young people from previously under-represented groups? Box 4.1 provides a summary of the main difficulties in data collection and interpretation of trends in access and participation. Figure 4.3 presents an analysis of available country-based data in a few countries. The figures presented are based on different definitions of the groups and cover different time periods, so the magnitudes are not strictly comparable across countries. The trend data are appropriate, however, for within country comparisons and reveal whether social participation is converging or diverging.

The picture presented in Figure 4.3 is mixed. Under various definitions, the gap between the participation rate of young adults from low socio-economic groups and the overall participation rate from this age group has remained the same if not

1. The principal sources of data on the educational attainment of parents of young adult tertiary education students are labour force surveys (LFS) which obtain from respondents information on the age, education or employment status of children up to about age 25. In some countries, the LFS estimates of participation in tertiary education show year-on-year differences which reflect variation in sampling and in response patterns rather than the actual trend. Moreover, participation can be over-estimated, to the extent that some of those identified as "participants" may have been registered but did not actively attend classes, submit required papers or sit exams. Finally, the LFS estimates of educational attainment are known in some countries to underestimate the realised levels of formal educational qualifications. There are two other broad measurement issues raised when interpreting the data presented in Figures 4.2a and 4.2b. First, the increase in the average length of young people's education over the past thirty years means that those lacking secondary education qualifications now comprise a smaller share of the adult population, which make comparisons over time problematic in some countries (e.g. Switzerland, where non-qualified migrants figure in the group with low education qualifications). Second, the younger age group's rates of participation in or completion of tertiary education programmes may understate their eventual levels of educational attainment owing to a growing tendency for participation at later ages. See Box 4.1.

BEST COPY AVAILABLE

Figure 4.3
Growth in participation rate for young adults in tertiary education by socio-economic group, through the mid-1990s
Average annual percentage point change



Expansion in tertiary education has not improved the proportion of students from lower socio-economic groups, whose participation has risen by less than average in several countries with data.

Sources: OECD Secretariat, based on country provided information for the thematic review of the first years of tertiary education and additional country-based data.
Data for Figure 4.3, page 92.

widened in Ireland, the United Kingdom, Belgium (Flemish Community), France and Japan. The U.S. experience appears to have been more favourable, with the lowest socio-economic group showing a percentage point increase in its rate of participation which is about one-third higher than the increase experienced for all young adults. High year-to-year fluctuations in U.S. participation rates make it difficult to conclude, however, that there has been a change from persistent gaps over several decades in participation rates across socio-economic groups.[2]

So, for most of the countries shown here, while enrolments of students from low social and economic groups have increased, those from groups already well-represented in tertiary education have increased by more. The net result is a distribution of students which looks about the same in terms of social and economic background as before expansion.

A conclusion to be drawn is that expansion alone has not been sufficient to reduce differences in rates of access of learners from different social and economic groups. Further growth may yet draw in larger numbers from under-represented groups, but many countries are taking steps to improve access by improving guidance and counseling and strengthening curricula at the secondary level and by bringing more tertiary education options closer to potential learners. Box 4.2 provides descriptions of specific approaches in several countries. These approaches reflect a mix of policies which apply direct measures to allow or support expansion (the changes in secondary education curricula, extended provision and distance learning at the tertiary level), but also indirect measures (early guidance and counseling, private tertiary education providers, cross-border flows of tertiary-level students) in which students, third parties and partners play a larger role and, therefore, demand itself becomes a more important driving force.

The participation of adults: Second chance or second bite? In what form?

Differences in participation rates by age have become a matter of policy interest, even as participation among older adults has been

2. See, for example, Mortenson Research Seminar (1999) and Kane (1995). Note that, among this group of countries, the United States has the highest overall rate of participation and the slowest rate of growth over the period examined.

BEST COPY AVAILABLE

BOX 4.1 ASSESSING TRENDS IN ACCESS AND PARTICIPATION IN TERTIARY EDUCATION

Within and among countries, difficult definitional and methodological problems are raised when assessing trends in access and participation.

First, target groups differ according to country circumstances and traditions. In many European countries, under-represented groups are defined in terms of the occupations of the parents. Low rates of participation in tertiary education by young adults whose parents are employed in lower status occupations are commonly viewed as an indication of inequality in the broadest sense, rather than purely as an indicator of economic disadvantage. In Japan and the United States, family income is used as a basis for comparison of students, to help assess differences in the resources available to meet tuition fees and other costs and, in this way, to provide an indication of potential differences in educational opportunity. In Australia, six "equity groups" have been identified for special attention and monitoring ranging from people of Aboriginal and Torres Strait Islander descent to those from socio-economically deprived or rural backgrounds to recent immigrants having an non-English speaking background. However the target groups are defined, countries are concerned about persistent differences: the extent to which participation and choices of people from identified groups remain limited across generations.

Second, volume growth and greater diversity in terms of learners and learning options make comparisons over time problematic. A focus on the conventional young adult age group will overlook development in patterns of tertiary education participation and completion for older adults. In the United Kingdom, commonly cited participation rates of 32 to 35% refer to young adult, full-time students. If account is taken of part-time students and older adults enroled full-time, the "lifelong" participation rate is estimated to be 60 to 70% (Smithers and Robinson, 1995). Equally, participation numbers will be affected, for example, by including (or excluding) those enrolled in strengthened programmes not previously identified as tertiary education (as in Canada or the Czech Republic) or in programmes offered by tertiary-level providers outside of the formal system (as with new forms of technology-based tertiary education in the United States or private training establishments in New Zealand).

Third, it is difficult to provide within a country a common base for comparison of access over time because the composition of the underlying population changes. For example, in Belgium (Flemish Community) the gap in participation rates of young people by socio-economic group (occupation of the head of the family) widened from 12 to 14 percentage points in the seven years to 1992, but over this period the share of young people from families in the lowest socio-economic group (family heads employed as manual workers) declined from 40 to 35% of the relevant population. So, the still relatively low 1992 participation rate for this group refers to a smaller share of the young adult population (Ministry of the Flemish Community, 1998). An alternative, employed in the U.S. and Japanese cases, is to construct a relative measure such as the bottom income quartile or quintile which is adjusted over time corresponding to the income distributions in the years of interest.

Fourth, the social and economic backgrounds of learners are difficult to obtain and also may be defined differently in different years. In some countries, there are legal restrictions on access to or reporting of data according to such characteristics. To respect individual privacy protections, the Australian Bureau of Statistics has developed a method which calculates an average income for all residents within each postal code. In France, changes in the definition of occupations, introduced to better capture the qualitative changes in jobs and work, make comparisons more difficult between years falling before and after the introduction of the new classification.

BEST COPY AVAILABLE

BOX 4.2 **CURRENT STRATEGIES TO IMPROVE ACCESS**

Extending guidance and orientation into lower secondary education. In France, an intensive information campaign aimed at secondary school students and their parents is intended to encourage early and careful self-evaluation of career options and prospects, the tertiary education programme(s) providing preparation for each career option and the academic background and learning skills needed to succeed in each of the identified study programmes. Similar efforts to provide better and more accessible information on careers and improved assistance in choosing among possible career options and associated study pathways through secondary and tertiary education may be found in Belgium, the United States and Japan.

Strengthening secondary education curricula. Reforms of secondary school curricula and standards in the United Kingdom, the United States, Denmark and the Czech Republic among other countries aim in part to enable young people to acquire essential academic, learning and cross-curricular skills. In the Netherlands, policies which provide for study profiles (*profielen*) help to foster a better connection between secondary and tertiary education, and self-study classes (*studiehuis*) help secondary school students develop new learning skills for use in tertiary-level study programmes.

Bringing tertiary education to the learner. New and long-standing approaches are used to spread the geographic provision of tertiary education:

- In **Sweden** and **Australia**, new institutions have been sited or existing institutions have been upgraded in parts of urban areas where participation rates have been low (Stockholm and Sydney, respectively). Policies in both countries also continue to foster development of institutional sites in rural areas.
- **Norway** has encouraged the development of linkages and networks of institutions to bring a wider range of tertiary education expertise and resources to learners in geographically-remote and poorly-served areas. Institutions are provided extra resources to meet the costs of providing decentralised study programmes.
- **Portugal** opened up tertiary education to private providers. The private sector has, over the past ten years, absorbed somewhat more than a third of the growth and caters particularly to adults in urban centres.

Distance learning options are available in various forms in a number of countries, through external departments or off-campus programmes in conventional tertiary education institutions or free-standing, distance learning institutions or agencies such as Open Learning Australia, Japan's University of the Air, Germany's *Fernuniversität Hagen* and the U.K. Open University. While these options often are aimed at older adults, sizeable numbers of young adult learners follow courses at a distance.

increasing. In those countries where available data permit comparisons over the eleven years to 1996, participation rates for 18 to 24 year-olds increased by about 70%. Over the same period, participation rates for the group of young adults above the traditional university age, aged 25 to 29, increased by almost 50%.[3]

There are several explanations for growth in the participation of those older than the traditional age, some of them relating to continuation of initial studies rather than to students taking a "second

3. The data refer to fifteen OECD countries. Details may be found in OECD (1997*b* and 1998*a*).

chance" (those who did no take up tertiary education at the "normal" time after leaving school) or to those taking a "second bite" (those who have qualified, but return after a period for more tertiary education). In nearly all countries but in different measure and form, there are tendencies for students: (i) to delay entry to build up entry qualifications to selective study programmes, to meet compulsory service requirements or to begin work, as in Norway; (ii) to undertake less than a full-time load or to "stop-out", as in Denmark, the United States and France; (iii) to be required to return to a first-year course sequence when shifting from one programme to another, either by choice or as a result of failure in the initial study option, as has been the case in Belgium (Flemish Community) and Denmark; or (iv) to continue studies beyond a single, first tertiary-level qualification in order to build up the mix of qualifications presented on the labour market, as in Australia, the Netherlands, France, Sweden and the United Kingdom.

These patterns are not in all instances inappropriate, but both system and institutional policies may need to be reviewed to ensure that they encourage and enable students to make progress and better accommodate varied patterns in the pathways and timing of studies leading to recognised learning objectives.

But, the ageing of the student pool also reflects in some countries increased participation by adults who previously would not have commenced studies at this level ("second chance" students). For university-based studies alone, age at first entry varies substantially, with France and Ireland as examples of countries in which most first-time entrants are young, and Canada, New Zealand and the United Kingdom as examples of what already could be termed the basis of a "lifelong learning" model in which significant numbers of both young and older adults enter for the first time. In France, 80% of first time entrants have enrolled by age 20; in Canada, the comparable age is 26 (see OECD, 1997*b* and 1998*a*).

In some countries, substantial numbers of older adults are participating in tertiary education beyond the usual early adult period. Information obtained from participants in the 1994-95 OECD and Statistics Canada International Adult Literacy Survey provide the baseline data.[4] Figure 4.4 presents two kinds of participation rate: the proportion of qualified 30-64 year-olds (i.e. those with at least upper-secondary education) who are enrolled in courses that lead to tertiary-level qualifications, and a broader measure of those enrolling in any course offered by a tertiary education institution during the year. Figure 4.4a gives the overall rates for each category, and Figure 4.4b uses pairs of countries to illustrate how these rates can break down by age, gender, educational attainment and occupation.

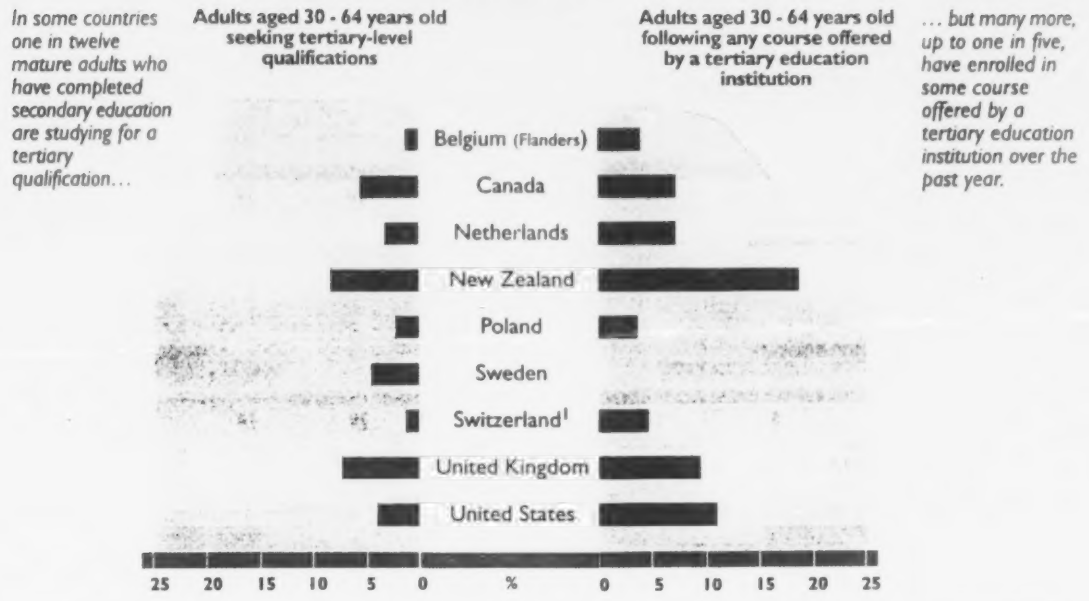
Figure 4.4a shows that the proportions seeking to acquire a tertiary-level qualification range from 1% in Belgium (Flemish Community) to 8% in New Zealand and the United Kingdom. But more participate in some form of tertiary level learning option: 3% in Poland, 7% in the Netherlands, 11% in the United States and 18% in New Zealand. In several countries, this represents a much greater number than those enrolled for tertiary education qualifications alone, though in Canada and the United Kingdom the differences are smaller. These participation rates should be seen in relation to levels of participation in any form of education and training[5] by adults who have completed secondary school – the population most likely to be able to benefit from tertiary-level studies. In the countries concerned, some 40 to 60% of these adults participate in some form of adult education and training each year.[6] So, in a few countries, tertiary

4 The data come from responses to a background questionnaire administered by interviews with each participant in the multi-country IALS effort. In each participating country, samples of 2 500 to 3 000 adults were drawn to be broadly representative of the civilian, non-institutionalised population aged 16 to 64. Realised response rates among countries ranged from 45 to 75%. Details on methodology and results may be found in Murray, Kirsch and Jenkins (1998), OECD and Statistics Canada (1995), OECD and Human Resources Development Canada (1997).

5 That is, basic through tertiary levels, offered by employers, public agencies and private entities as well as educational institutions.

6 These estimates refer to participation in any organised education and training, regardless of the duration of the course (hours engaged). Engagement in informal learning is not covered in the IALS survey but it is likely to be substantial, see, e.g. Livingstone (1998).

Figure 4.4a
Adult participation in tertiary education, 1994-95
Participants as percentage of population


In some countries one in twelve mature adults who have completed secondary education are studying for a tertiary qualification...
Adults aged 30 - 64 years old seeking tertiary-level qualifications
Adults aged 30 - 64 years old following any course offered by a tertiary education institution
... but many more, up to one in five, have enrolled in some course offered by a tertiary education institution over the past year.
Belgium (Flanders)
Canada
Netherlands
New Zealand
Poland
Sweden
Switzerland[1]
United Kingdom
United States
25 20 15 10 5 0 % 0 5 10 15 20 25

1. German and French combined (95% of population)
Source: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95
Data for Figure 4.4a, page 93

education already accounts for a good share of education and training for qualified adults.

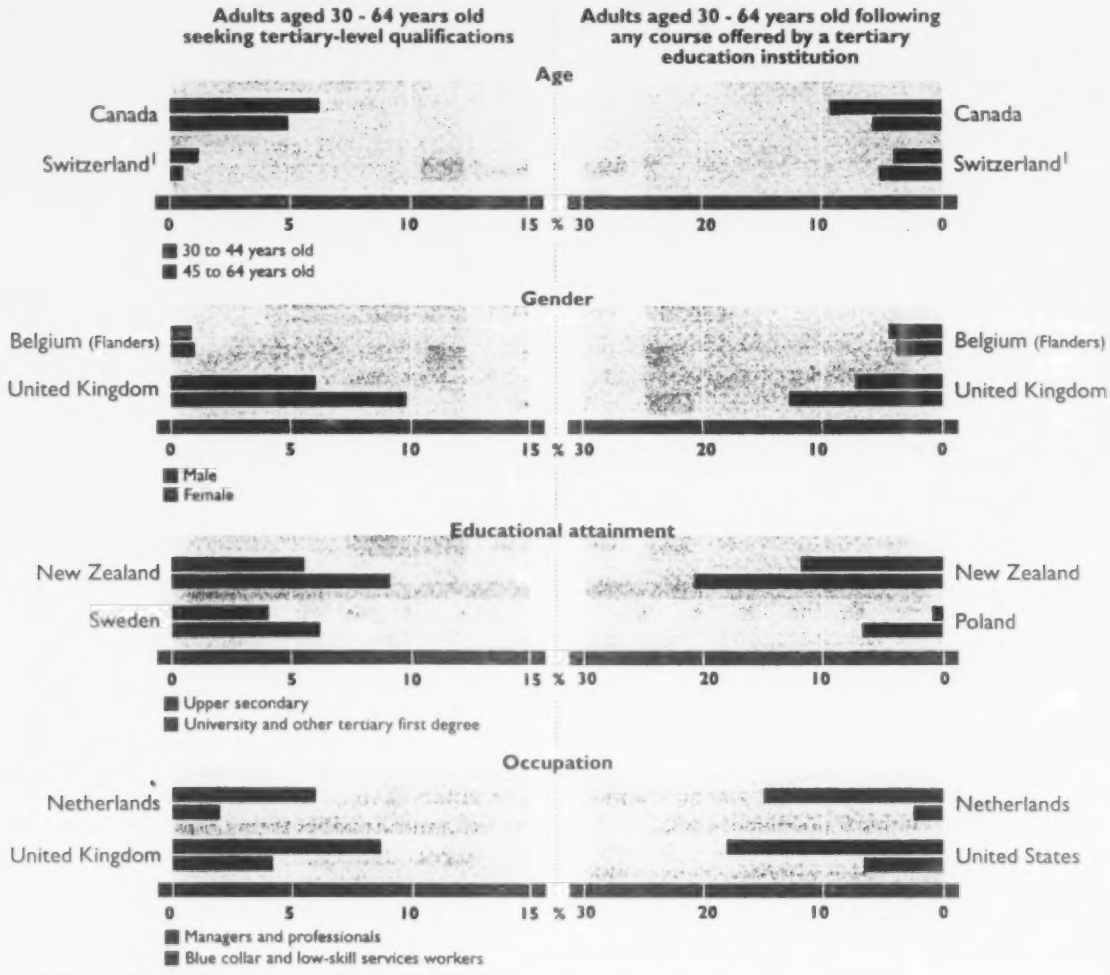
More detailed comparisons by age, gender, prior educational attainment, employment status and occupation are provided in the Statistical Annex. The principal patterns, illustrated with reference to pairs of countries in Figure 4.4b are:

- Generally, those 30 to 44 years of age are more likely to be studying for tertiary-level qualifications than adults 45 to 64 years old; for Canada, the difference in participation rates between the two age groups is, relatively, much less.
- In all but two countries within this group, women 30 to 64 years old are more likely than men in the same age group to participate in studies leading to a degree; the gender difference is relatively small in Belgium (Flanders).
- Adults 30 to 64 years old pursuing tertiary education qualifications are more likely to be "second-bite" learners, and in some countries much more likely as can be seen for New Zealand. Sweden provides a contrasting case: the rate of participation of adults in this age group lacking tertiary education qualifications – "second chance" learners – is relatively closer to that for adults who have completed some tertiary education.
- Those 30 to 64 years of age in managerial and professional occupations are more likely than blue collar or lower-skill services workers in this age group to be following studies toward a degree.

The patterns indicate that gaps in the acquisition of qualifications observed for young people in their early twenties are being partly met through participation in tertiary studies leading to a degree

BEST COPY AVAILABLE

Figure 4.4b
Adult participation in tertiary education, broken down by age, gender, educational attainment and occupation, 1994-95



1. German and French combined (95% of the population).
Source: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.
Data for Figure 4.4b, page 93

or qualification by those lacking such qualifications in their later adult years. But, in addition, in a number of countries there is relatively strong participation in degree-oriented studies by those who may require new qualifications, including people in managerial and professional occupations.

More detailed examination of the data show that:

- In Belgium (Flanders), adult women's participation in all courses – whether directed toward a degree or not – is lower than for men; this reverses the observed pattern when only studies undertaken toward a degree are examined.

- If adult blue collar and lower-skill services workers in the Netherlands are less likely to participate in courses aiming toward a tertiary degree, the gap widens when participation in all tertiary-level courses is examined.

BOX 4.3 **POLICIES AND PROGRAMMES TO OPEN UP NEW PATTERNS OF PARTICIPATION OVER A LIFETIME**

Introducing a lifelong learning perspective in programmes now catering to young adults

Bachelors' degrees. New bachelors degrees now being more widely advanced in countries having primarily long first degrees, such as Germany, Denmark, Finland, the Netherlands, the Czech Republic and Portugal, are being seen by some as a qualification for initial employment, allowing graduates the possibility to enter the labour market or undertake other activities – *but* with the expectation that significant numbers will return to tertiary education after a period of work or other activity for a continuation of studies toward the long first degree. This would give rise to a pattern, incorporated directly into the qualification and programme structures, of several entries into and exits from tertiary education extending well into adult life – i.e. a realised pattern of lifelong learning, developed and supported in tertiary education programmes.

Work experience. Employment, forms of national service (such as Americorps in the United States) or the French initiative emplois-jeunes could be used or organised more strategically as experience which eventually enriches tertiary-level studies and learning. Sweden's 25-and-4 scheme, established in the 1980s, has just such a vision: a special admissions route is available for those who are at least 25 years old and have had four years of work experience.

Addressing older adults' gaps in and demands for learning

Adapting course schedules. In Denmark, tertiary education institutions now offer as Open Education, at night and for a modest fee, study programmes which parallel those offered to regular students during the day.

Private tertiary education providers. In Portugal, private tertiary education institutions cater to the demands of older adults seeking formal qualifications. Students attending these institutions may follow study programmes at night, and they now have greater access to external support to help finance the costs of their studies.

Non-degree programmes. In the United States, a wide variety of tertiary-level learning opportunities are offered – and being pursued – outside of formal degree programmes. These include programmes leading to post-baccalaureate certificates offered by tertiary education institutions, in which participation has doubled since 1990, and "industry"- based programmes offered by such agencies or entities as the National Institutes of Health, the U.S. Department of Agriculture "Graduate School,"and the Tennessee Valley Authority; industry certification schools run by Avid / Henninger Technologies (video/ film/ software/ hardware), Novell, Oracle and Microsoft; corporate schools such as Sun Microsystems University; and virtual coursework provided by the software industry.

Initiatives which widen the range of learning options eligible for public funding

- In **France**, a new lifelong learning initiative aimed at universities provides financing, via competitive funding, to institutions which offer new types of programmes aimed at adults. The programmes are to be more flexible, multidisciplinary and take into account prior learning. Those who complete the courses will receive a certificate of completion which is not directly linked to the national degree (but which could eventually be recognised as partial credit).

- In the **United Kingdom** Individual Learning Accounts(ILA), opened up in a bank by individual learners, are eligible for partial matching contributions from the government. Learning eligible for ILA support is not defined by institutions or by the higher education quality assurance agency, but rather is broadly recognised by the University for Industry (which is not a university, but rather an open learning, assessment and brokering body). Tertiary education institutions may develop – as other providers – modules eligible for ILA support and UfI recognition.
- In the **United States**, tax payers (or their parents, in the case of dependents) may take a credit for identified tertiary education expenses against taxes owed or deductions to reduce income subject to taxation. New tax provisions for Hope Scholarship Credits, Lifetime Learning Credits, deductions for student loan interest, education and other Individual Retirement Accounts (IRAs), and exclusion from income of employer-provided educational assistance apply to studies undertaken in nearly all accredited public, private and proprietary tertiary education institutions. Unlike student financial aid provisions, some of the new tax benefits may be claimed by learners studying less than half-time (e.g. a single course module) or participating in recognised internship or residency programmes.

The country experiences and data call into question the long-standing focus on immediate rates of entry (e.g. rates of participation of 18 to 21 year-olds). First, a more purposeful lifelong learning approach in tertiary education may be needed to accommodate and foster options for people to enter tertiary education at a later age and to return periodically as needed, even as participation rates for a generation, over the life cycle, increased. Such an approach would need to give attention to widening the learning and work choices of young people on the completion of secondary education and taking the range of those initial experiences into account in the design of programmes, teaching and learning. Second, participation by older adults who have completed at least upper secondary education remains uneven, and policies to address gaps need to be considered. Box 4.3 describes several new and long-standing policies and programmes which are opening up new patterns of participation in tertiary education over the life cycle.

3. EXTENDING PARTICIPATION IN A WIDER RANGE OF TERTIARY-LEVEL LEARNING OPTIONS

Even if tertiary education now accommodates larger numbers from previously under-represented groups, the options open to these learners may be limited in ways that lead to continuing differences in participation or implied differences between groups in access to learning and other resources. Access, as pointed out in *Education and Equity in* OECD *Countries* (OECD, 1997*a*), is not enough. A range of tertiary education learning options needs to be widely available to all who can potentially benefit from them and measures need to be taken to support the learning of all who undertake studies at this level.

Countries have adopted various means to provide a wide range of tertiary education options, appropriate to the backgrounds and interests of individual learners and to the needs of the economy and society. One approach has been to expand provision in the form of short-cycle programmes more closely linked to employment. The development of such programmes has advanced through the establishment of new institutions, as in Mexico's technological universities, or through an upgrading and extending of existing institutions at the secondary level, part of the strategy in such countries as Canada, the Czech Republic and Finland. As shown in Figure 4.5, the effects of such a strategy can already be seen in Canada. For most other countries, as both universities and other tertiary education institutions expanded in the first half of the 1990s, the division of first-degree enrolments between the two types of institution has remained about the

same. There is a slight tendency for countries with relatively stronger overall expansion to have growing share of university enrolments: among the eight countries experiencing the most rapid growth in first degree enrolments (the countries listed first in Figure 4.5), six recorded relative increases in the universities' share. In seven of the nine remaining countries, the relative shares of other tertiary education providers increased.[7] While these differences are modest, more substantial shifts in enrolment shares might in future be observed particularly in countries where new policies have yet to take full effect. In Finland, for example, students in the relatively new vocationally-oriented institutions (AMK) now account for about a quarter of all tertiary-level enrolments; by 2000, the share will be about 40% on the way to an eventual share of two-thirds.

In these and other countries, greater diversity also is being realised within universities and other institutions in a variety of forms:

- development of distinct institutional profiles within a single system, as in Sweden, Australia, the United Kingdom and generally the United States;
- integrating within conventional university study programmes vocationally-oriented work modules, "applied or integrated" studies or work experience, as in the United Kingdom, United States and France;
- expanded professionally-oriented options at the post-graduate level in Australia, the United Kingdom, France and the United States;
- experiencing with greater or lesser oversight the expansion of participation in tertiary-level studies through institutions or means other than formal tertiary education institutions

7. Note that these comparisons refer to total enrolment in these types of institution, and so may not fully capture emerging trends in the choices being made by entering students (for which trend data is not available). Indeed, even if university-based and other tertiary education programmes expanded equally, the university share would tend to increase in most countries because the university-based programmes usually require more years of study.

Figure 4.5
Split between university and other tertiary education, 1990 and 1996
Enrolments for first degrees or diplomas

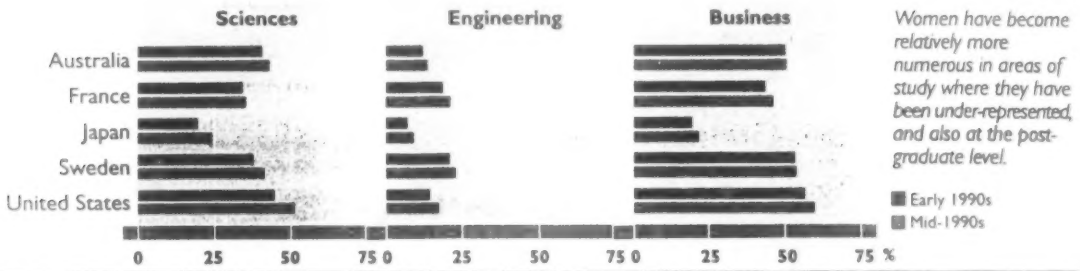
In most countries, the proportion of tertiary education taking place in universities remained about the same. Where overall growth has been strongest, the university share has tended to increase.

Countries are ranked in descending order of growth in enrolment in first-degree or diploma programmes between 1990 and 1996.

Source: OECD Education Database.
Data for Figure 4.5: page 93

BEST COPY AVAILABLE

Figure 4.6a
Share of women in first-degree or diploma programmes in tertiary education,[1] early to mid-1990s



1. Owing to differences in the ways fields are classified and in the years covered, the data are not comparable across countries. The patterns of trends can be compared.

Sources: OECD Secretariat, based on country-provided data for thematic review of the first years of tertiary education and additional country-based data.

Data for Figure 4.6a, page 94

(further education colleges, secondary schools, new providers), in Australia, the United Kingdom, the United States and New Zealand among others;

- encouraging or permitting cross-border co-operation with institutions of different as well as similar profiles, in many countries.[8]

The position of women

Has growth and a widening range of tertiary education learning options been reflected in different groups' patterns of attendance? With regard to the position of women, they now constitute the majority or near-majority of tertiary-level students. In Australia, for example, women's enrolment increased by 30% in the six years to 1996; for men, the increase amounted to 21.9%. On other dimensions of participation, long-standing patterns are generally unchanged – with some exceptions.

- Trends in the shares of women enrolled in university-based as compared with other tertiary education programmes follow mostly the overall trends, shown in Figure 4.5. However, in both Japan and Poland, the shares of women in programmes offered by other tertiary education providers declined between 1990 and 1996. In these countries, women's enrolment in universities increased more rapidly than in other tertiary education institutions.

- In a group of five countries for which country-based trend data of enrolment by field of study are available, there have been increases in the 1990s in the shares of women enrolled in sciences, engineering and business and related study programmes. As shown in Figure 4.6a, the changes over this period in women's shares have been modest but positive in each of these fields.

- In all but two countries shown in Figure 4.6b, there is a significant, sometimes substantial increase in the share of women in post-graduate study programmes.

Enrolments do not provide a picture of eventual qualifications, nor do qualifications reveal the breadth of expertise in the sciences, engineering and business fields. Analyses of college records in the United States show that about 60% of women who enter an engineering study programme eventually acquire a bachelor's degree in the field, about half of those who switch enter study programmes in the sciences and the remainder have completed a significant proportion of the engineering study programme (Adelman, 1998). So, the expertise in engineering acquired by women is larger than indicated by programme enrolments or earned qualifications (similar patterns may be discerned in the sciences and computer science). But, notwithstanding the modest improvements in enrolments, earned

Figure 4.6b
Share of women in all post-graduate enrolment, 1990 and 1996

Countries are ranked in ascending order of growth of total post-graduate (second university degree or doctoral) enrolment.

Source: OECD Education Database.
Data for Figure 4.6b, page 94.

degrees and the "hidden" expertise of those who have switched from these fields, the talent pool remains largely untapped: shares of women in these fields typically lag behind the representation of men in most countries. The reasons why women choose not to enter or to continue in the sciences and engineering are many and varied. Purposeful approaches such as integrated applied science study programmes which are multi-disciplinary in organisation and orientation offer one such strategy which has proven to be successful not only in attracting and retaining women but in preparing them for post-graduate studies in the sciences or for entry into the labour market.

Differences in access to subsidies and learning resources

The patterns and consequences of different pathways for different groups are revealed in data assembled for two countries: France and the United States (see Table 4.1).

In France, the chances for a student from a low socio-economic group to enter a selective and well-resourced preparatory class for the *Grandes Écoles* (CPGE) as compared to a less well-resourced, open access first-cycle programme in the university are one in 16. For students from higher socio-economic groups, the comparable chances are one in seven.[9] The same pattern may be seen in the United States: the chances of a first-year student in the lowest socio-economic group to enrol in a more selective, research university as compared to a public community college is about one in twelve.[10] For a first-year student from the highest income group, the relative chances are better than even. The result of this pattern has been substantial differences in access to resources which directly or indirectly support teaching and learning and the student experience.

Illustrative figures are shown in Table 4.1.[11] The calculations refer to country-specific situations and, while not comparable in detail, may be viewed as suggestive of a shared pattern. As shown there,

8. For an analysis of the ways diversity in provision is taking place within universities as well as across tertiary education as a whole, see OECD (1997*b*).

9. One reason for this pattern is that entry into selective tertiary education options presumes a strong academic preparation through the general *baccalauréat* streams, but those from lower socio-economic groups are more likely to follow technical or vocational baccalauréat streams. Those failing to gain a place in the selective options pursue the open access route of first cycle university studies.

10. Research universities tend to enroll students with higher academic achievement, as measured by scores on college entrance examinations. These institutions base admissions decisions on a number of criteria, although most admitted students have test scores at the upper end of the distribution.

11. The calculations in Table 4.1 combine and extend prior analyses on patterns of participation and how institution expenditures compare to what students and their families pay. See McPherson and Schapiro (2000) and Winston, Carbone and Lewis (1998).

BEST COPY AVAILABLE

students from low socio-economic groups receive higher levels of public support than do their peers from high socio-economic groups: in both France and the United States, grants and other forms of student and family support on average favour the low socio-economic groups. The differences are diminished when the chances of attending well-resourced programmes are taken into account. The key points to be drawn from these illustrative calculations may be summarised by reference to the U.S. case:

- The U.S. first-year student from a high socio-economic group who attends a research university (the odds are better than even that he or she will do so, when compared to the chances of enrolling at a public community college) will benefit from higher overall resources than a first-year student from a low socio-economic group enrolling in a public community college, even when financial aid grants are taken into account. The advantaged student "pays" $9 423 for $20 568 in educational resources, while the student from the low socio-economic group attending a public community college "pays" $336 for $8 274 in educational resources.

- Moreover, even looking only at students enrolling in research universities, the pattern of attendance among these institutions leads to a difference in access to learning resources of about $4 000 ($20 568 vs. $16 775) in favour of students from the higher socio-economic group. The net result, after student aid grants are taken into account, is that the student from the low socio-economic group receives an average $3 000 more per year than the student from the high socio-economic group. The former comes from a family with less than $20 000 income; the latter from a family with an income of $100 000 or more.

The analysis thus illustrates another consideration in assessing how access and participation have evolved in the course of expansion, in this case access to learning resources as well as public subsidy support. Owing to patterns of enrolment, low socio-economic students tend to pay less (or receive more public subsidy support) but receive less in terms of learning resources available through the programmes or institutions in which they are more likely to enrol. The concern here is not the measured differences in resources among learning options, which broadly reflect differences in the nature and fields of teaching and learning offered and in cost structures. Moreover, many students who follow less well-resourced programmes may meet their specific learning needs and interests. Rather, the illustrative calculations show another consequence of the choices being made by otherwise qualified young people from low socio-economic backgrounds to pursue a more constrained set of tertiary education options for them, foregoing learning options which might better develop their abilities and interests and also means foregoing more substantial learning resources.

Differences in access to different learning opportunities and learning resources are, in reality, even more varied and complex. In increasing numbers, students from both high and low socio-economic groups depart from direct pathways toward a qualification (see OECD, 1997*b*). The causes and the consequences of the more varied pathways, however, may differ according to the student's background and circumstances. In some countries where pathways are more rigid and places more limited, students ranking lower in access qualifications or lacking resources needed to pursue alternative options from other providers or in other locations may find themselves in a second, third or lower choice option that does not meet their needs or interests and therefore face a higher risk of dropping out (see OECD, 1997*b* and 1998*b*; Moortgat, 1996). So, these students follow involuntary pathways, sometimes with additional costs imposed by requirements to re-take courses or enter new courses following a switch.

Students from high socio-economic groups are more likely to be able to choose from the full range of tertiary education options. Combining vocational and academic qualifications (as in France), acquiring double degrees (as in Australia) or advanced degrees, or changing the direction

Table 4.1
Access to public subsidies and learning resources for tertiary education students from low and high socio-economic groups by type of institution or programme, France and the United States, mid-1990s

	Selective programme		Open access programme	
	Socio-economic group		Socio-economic group	
	Low	High	Low	High
France, 1994				
	Preparatory classes for the Grandes Ecoles		*University, first-cycle*	
Percentage enrolling	3.4	10.4	64.0	73.6
Net subsidies to students and their families (francs, per year)	9 792	7 504	9 792	7 504
Institutional expenditures per student (francs, per year)	62 000	62 000	32 900	32 900
United States, 1995				
	Research university		*Public two-year college*	
Percentage enrolling	3.7	17.3	47.1	13.7
Net subsidies to students and their families (dollars, per year)[1]	-2 572	-9 423	-336	-724
Institutional expenditures per student (dollars, per year)	16 775	20 568	8 274	8 274

1. As average tuition fees are greater than public subsidies to help families meet the fees, net subsidies are indicated as a negative amount.

Sources: OECD Secretariat, from country-based information.

Notes: **France**: Percentage enrolling is based on the population of students in first-cycle tertiary education. Socio-economic groups are defined as "low", agricultural workers, salaried employees and blue collar workers; "high" as high level managers and those working in the professions. These groups account, respectively, for 30 and 33% of first-cycle tertiary level enrolment. Public subsidies to students include bourses, indirect public subsides for residence halls and dining facilities, and tax relief for parents. The figures refer to the eight-month academic year (based on estimates of monthly averages), for students under 23 years of age and living with their parents. Institutional expenditures are annual expenditures per student in the identified programme. The data for university programmes refer to all cycles, but exclude IUT and university-based engineering programmes. Ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche (1996), *Repères & références statistiques sur les enseignements et la formation, Édition* 1996, Paris, Tableau 6.9; I.C. Eicher and L. Gruel (1996), *Le financement de la vie étudiante*, Cahiers de l'OVE, Paris; Ministère de l'Éducation nationale (1994), *Le compte de l'éducation. Années* 1989 *à* 1993, Les dossiers d'éducation et formations, No. 49, Paris, p. 9.

United States: Estimates refer to first-time, full-time dependent freshmen. Socio-economic groups are defined as "low" with family incomes below $20 000 and "high" with family incomes of $100 000 and over. In 1995, these groups accounted for 17 and 20%, respectively, of all first-time, full-time freshmen. Research universities tend to enrol students with higher levels of academic achievement. Net public subsidies are calculated as tuition fees less grants, and averaged for all undergraduates in each type of programme and student group. Implicit public subsidies in student loans are not taken into account. Institutional expenditures are annual expenditures per student, weighted to reflect the different attendance patterns of students within the identified socio-economic group. Estimates are adjusted for changes in price levels between 1994-95 (base year) and 1995-96 (reference year). U.S. Department of Education (1999), *Student Financing of Undergraduate Education* 1995-96, Washington, D.C.; Gordon C. Winston, Jared C. Carbone and Ethan G. Lewis (1998), *What's Been Happening to Higher Education: Facts, Trends and Data* (1986-87 to 1994-95), Williams Project on the Economics of Higher Education, Discussion Paper No. 47, Wi..ams College, Williamstown, MA; M.S. McPherson and M.O. Schapiro (2000), "Trends and patterns of participation in U.S. higher education: Linking differences in costs and financial aid to differences in access, choice and opportunity", forthcoming, OECD, Paris.

BEST COPY AVAILABLE

BOX 4.4 CURRENT STRATEGIES TO PROMOTE LEARNING AND PROGRESS FOR ALL STUDENTS

- A 10-point plan in **Belgium** (Flemish Community) calls for improved guidance for first-year students, smoother transition to other courses after (partial) failure and the equivalent of 5% of each university's academic staff assigned to student guidance and support toward the first candidature at the end of the first year.
- The organisation of first cycle study programmes has been changed in **France**. The main features are: a new semester approach in the first year, with separate modules organised to help students develop study skills and to "sample" different subject areas; additional counseling services to help students make informed study choices in the course of their first-cycle studies; wider scope for students to switch among study lines during the first year, with little loss of time; additional academic support through the *tutorat*, in which older students assist new students; improvements in student life through support for various activities.
- Reforms of the "general education" component of the bachelor's degree in the **United States** are leading to greater clarity in learning objectives for the first years of the degree programme and harnessing studies within individual course modules to those objectives. "Remedial" education is provided to entering students who may not have acquired the levels of reading or mathematics skills needed for tertiary-level studies and, while controversial in its current form, appears to have enabled some students – particularly adults – to eventually acquire tertiary qualifications.
- Studies in the **Netherlands** now have to be practicable (*studeerbaarheid*), with the aim of reducing drop-out and the number of years of study and improving the chances of graduation.
- New routes of access are expanding in the **United Kingdom**, via NVQ and GNVQ, and in **Japan** through its National University for Academic Assessment.
- A National Qualification Framework (NQF) was introduced in **New Zealand**, to better integrate qualifications and learning options and to improve student pathways. Responsibility for a broadened NQF will come under a new Quality Assurance Authority (QAA), with the former New Zealand Qualifications Authority focusing on quality assurance of qualifications and education providers. Qualifications frameworks can be found in **Australia** and the **United Kingdom**; a new Qualifications Authority has just been established in **Ireland**.
- The wider diffusion of microcomputers and internet access has fostered new learning options in the **United States**, which extend more widely practices used in free-standing distance education professional programmes.

of studies are seen by these students and their families as ways to improve chances on the labour market and to make adjustments of study choices. The issue for policy and practice is how to ensure that all learners will both have access to a wide range of learning options and be enabled and encouraged to progress and succeed in study programmes, pathways and combinations which best meet their interests and backgrounds as well as wider social and economic needs.[12] Box 4.4 presents examples of recent policy initiatives aimed at supporting learning for all students.

12. For further discussion and analysis of the role of student financial support, see OECD (1998*b* and 1998*c*) and Chapter 1 of this volume.

BEST COPY AVAILABLE

4. CONCLUSIONS

This chapter has analysed a range of the available evidence on trends in the patterns of participation during the recent expansion of tertiary education. The picture is mixed: while growth has meant increased participation from previously under-represented groups, other groups' participation has increased as well. There are indications that recent growth and ongoing evolution in tertiary education has been accompanied by a widening of learning options, and in some countries a widening of provision beyond degree programmes to meet gaps and new needs for older adults. Yet, women remain in the minority in some subject areas and students from low socio-economic groups are least likely to enter well-resourced programmes and institutions. Current policy initiatives, some with new features reflecting new circumstances, offer the first steps to address remaining gaps and new needs. The effects of these policies are not yet fully known: some have been implemented too recently, others have had limited effects and still others have had unintended consequences. Further adaptations in secondary and tertiary education as well as adult education will be needed if progress is to be realised.

More generally, as overall participation rates continue to increase, a new orientation toward inclusiveness is emerging. The most promising direction now reflected in some countries' policies is one which seeks not only to welcome all students but also to strongly promote and encourage their success. This orientation directly implicates the ways teaching and learning are organised, specifically to respond to the learning backgrounds and interests of every student rather than focusing on results for identified groups. There are implications as well for financing: in the first instance, how to marshall the resources for an ever larger volume (as analysed in Chapter 1); secondly, how to use financing in ways that allow for more varied choices of when, where and how to study. In short, the challenge is how to organise and finance even more participation in learning at this level which is both wide in scope and life long. ■

References

ADELMAN, C. (1998), *Women and Men of the Engineering Path: A Model for Analyses of Undergraduate Careers*, U.S. Department of Education and the National Institute for Science Education, Washington, D.C.

BLOSSFIELD, H.-P. and **SHAVIT, Y.** (1992), "Persisting Barriers: Changes in Educational Opportunities in Thirteen Countries", in Shavit, Y. and Blossfield, H.-P. (eds), *Persistent Inequality: Changing Educational Stratification in Thirteen Countries*, Westview Press, Boulder, Colorado.

ERLICH, V. (1998), *Les nouveaux étudiants: un groupe social en mutation*, Armand Collin, Paris.

EURYDICE (1997), *Key Data on Education in the European Union 1997*, European Communities, Luxembourg.

KANE, T.J. (1995), "Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?", National Bureau of Economic Research Working Paper No. 5164, Cambridge, Massachusetts.

LIVINGSTONE, D. (1998), *The Education-Jobs Gap*, Garamond Press, Toronto.

McPHERSON, M. S. and **SCHAPIRO, M.O.** (2000), "Trends and Patterns of Participation in U.S. Higher Education: Linking Differences in Costs and Financial Aid to Differences in Access, Choice and Opportunity", forthcoming, OECD, Paris.

MINISTRY OF EDUCATION AND SCIENCE (1995), "The Demand for Tertiary Education", Contribution by the Netherlands to the OECD Project on Mass Tertiary Education, Zoetermeer.

MINISTRY OF THE FLEMISH COMMUNITY (1998), *Flemish Educational Indicators in an International Perspective: 1998 edition*, Brussels.

MOORTGAT, J.-L. (1996), *A Study of Dropout in European Higher Education*, Council of Europe, Strasbourg.

MORTENSON RESEARCH SEMINAR (1999), "Educational Opportunity by Family Income, 1970 to 1997", *Postsecondary Education Opportunity*, No. 86, Oskaloosa, Iowa.

MURRAY, T.S., KIRSCH, I.S. and **JENKINS, L.** (eds.) (1998), *Adult Literacy in OECD Countries: Technical Report on the International Adult Literacy Survey*, National Center for Education Statistics, U.S. Department of Education, Washington, D.C.

BEST COPY AVAILABLE

OECD (1997*a*), *Education and Equity in* OECD *Countries*, Paris.

OECD (1997*b*), *Education Policy Analysis* 1997, Paris.

OECD (1998*a*), *Education at a Glance*: OECD *Indicators* 1998, Paris.

OECD (1998*b*), *Education Policy Analysis* 1998, Paris.

OECD (1998*c*), *Redefining Tertiary Education*, Paris.

OECD and **STATISTICS CANADA** (1996), *Literacy, Economy and Society: Results of the First International Adult Literacy Survey*, Paris and Ottawa.

OECD and **HUMAN RESOURCES DEVELOPMENT CANADA** (1997), *Literacy Skills for the Knowledge Society: Further Results from the International Adult Literacy Survey*, Paris.

SMITHERS, A. and **ROBINSON, P.** (1995), "Post-18 Education: Growth, Change and Prospect", *CIHE Executive Briefing*, Council for Industry and Higher Education, London.

U. S. BUREAU OF THE CENSUS (1995), *Social and Economic Characteristics of the Population: School Enrolment*: October 1994.

WINSTON, G.C., CARBONE, J.C. and **LEWIS, E.G.** (1998), "What's Been Happening to Higher Education? Facts, Trends and Data", Discussion Paper No. 47, Williams Project on the Economics of Higher Education, Williams College, Williamstown, Massachusetts.

STATISTICAL ANNEX

Data for the figures

Chapter 1

Data for Figure 1.1
Changes in spending for education, 1990-95

	Index of public and private expenditures for educational institutions (1990=100)		
	Direct public expenditure plus public subsidies via households and other private entities[1]	Private expenditure excluding public subsidies via households and other private entities[2]	Percentage point change in the share of total public expenditure allocated to educational institutions
Australia	117	165	0.2
Austria	117		0.1
Belgium (Flem. Community)	112		
Canada	115	146	1.3
Denmark	117	215	0.1
Finland	100	x	-2.0
France	120	109	0.5
Hungary	80	139	.
Iceland	108	x	-1.6
Ireland	135	138	1.2
Italy	82		
Japan	105	109	
Mexico	164		6.4
Netherlands	102	110	
New Zealand	117		
Norway	126		2.7
Spain	119	126	2.7
Switzerland	107		
Turkey	76	1 133	
United Kingdom	119		

. Data not available
x Data included in another category or column

1. Direct expenditure for educational institutions plus public subsidies to households and other private entities destined for educational institutions. Subsidies supporting living costs and other education-related expenses and tax breaks are not taken into account.
2. Payments for tuition fees and other fees, grants and contracts. Data refer to net payments, i.e. after public financial aid to students and other subsidies to private entities attributable to private payments to educational institutions are deducted. Living costs and other education-related expenses are not included.

Source: OECD Education Database.

Data for Figure 1.2
Changes in enrolments between 1995 and 2005, under three scenarios

A) Enrolment projections for 0-5 year-olds in 2005

		Projected changes in enrolment levels between 1995 and 2005		
	Enrolment in 1995	Maintain 1995 participation rate	Achieve median participation rate of 1995	Achieve "good practice" participation rate of 1995
Australia	435 114	15 154	41 797	173 882
Austria	178 274	-25 490	24 493	18 099
Canada	578 879	-62 800	104 231	293 424
Finland	59 455	-8 218	48 421	78 299
Ireland	83 192	-7 093	22 358	51 591
Japan	3 071 666	185 427	185 427	185 427
Netherlands	385 927	-62 144	-62 144	21 151
New Zealand	168 435	-2 281	-2 281	-2 281
Norway	116 759	-7 632	-7 632	20 290
Portugal	177 384	-19 371	-12 132	64 620
Spain	1 030 851	-94 683	-94 683	-94 683
Switzerland	94 732	-10 788	-52 372	-93 113
Turkey	213 083	10 582	2 319 046	3 020 342
United Kingdom	1 858 565	-245 558	-245 558	-245 558
United States	7 842 861	-675 595	-675 595	1 264 505

BEST COPY AVAILABLE

Data for Figure 1.2
Changes in enrolments between 1995 and 2005, under three scenarios *(continued)*

B) Enrolment projections for 15-19 year-olds in 2005

	Enrolment in 1995	Projected changes in enrolment levels between 1995 and 2005		
		Maintain 1995 participation rate	Achieve median participation rate of 1995	Achieve "good practice" participation rate of 1995[1]
Australia	1 033 899	68 681	68 681	132 657
Austria	341 442	24 499	34 081	94 588
Belgium	574 821	- 6 820	- 6 820	- 6 820
Canada	1 510 627	116 641	116 641	327 330
Czech Republic	586 533	- 148 935	- 104 389	- 26 702
Denmark	259 800	- 16 791	- 16 791	- 1 785
Finland	265 531	- 8 181	- 8 181	7 761
France	3 334 102	- 36 548	- 36 548	- 36 548
Germany	3 745 934	490 782	490 782	490 782
Greece	480 869	- 116 914	- 49 354	- 20 176
Hungary	547 503	- 144 331	- 93 016	- 19 785
Ireland	264 372	- 42 676	- 42 676	- 20 372
Japan	5 017 463	- 1 189 253	- 174 468	605 882
Korea	2 916 757	- 525 804	- 518 547	- 432 124
Luxembourg	16 031	1 405	3 214	- 6 319
Mexico	3 470 373	22 219	4 204 883	5 441 595
Netherlands	815 450	37 322	37 322	37 322
New Zealand	195 041	22 150	27 288	63 112
Norway	224 854	17 193	17 193	- 23 440
Portugal	531 759	- 159 798	- 129 513	- 64 699
Spain	2 324 514	- 806 543	- 806 543	- 367 230
Sweden	418 247	62 032	62 032	81 020
Switzerland	317 516	39 929	39 929	69 538
Turkey	1 963 417	- 287 187	2 373 351	3 072 134
United Kingdom	2 464 596	206 706	398 139	859 411
United States	12 929 748	2 008 090	2 288 555	4 740 675

C) Enrolment projections for 20-24 year-olds in 2005

Australia	430 690	- 4 118	- 4 118	70 579
Austria	127 566	- 3 716	37 901	69 514
Belgium	270 663	- 20 440	- 20 440	- 20 440
Canada	680 887	38 873	38 873	123 277
Czech Republic	126 754	- 21 783	89 777	131 145
Denmark	133 466	- 34 759	- 34 759	- 31 199
Finland	124 200	11 256	11 256	11 256
France	1 379 776	123 950	123 950	54 959
Germany[2]	1 529 995	- 27 160	- 27 160	259 961
Greece	163 376	18 726	52 221	91 412
Hungary	122 637	22 315	78 266	116 649
Iceland	7 422	- 16	- 16	415
Ireland	56 146	6 538	45 581	65 016
Korea	1 100 940	- 162 583	79 708	305 274
Mexico	992 507	1 192	2 026 810	2 603 659
Netherlands	437 230	- 78 286	- 78 286	- 78 286
New Zealand	87 616	1 687	1 687	13 805
Norway	117 954	- 19 428	19 428	19 428
Portugal	258 758	- 55 654	55 654	17 694
Spain	1 094 220	293 686	293 686	- 176 393
Sweden	168 243	- 18 511	- 9 024	21 395
Switzerland	105 357	- 3 237	31 988	58 228
Turkey	563 381	57 619	1 572 981	1 981 136
United Kingdom	1 003 144	- 42 249	141 102	359 253
United States	5 077 257	540 462	1 093 079	2 271 937

Figure 1.2 is based on ratios for each scenario, calculated as $\frac{\text{1995 enrolment + projected change}}{\text{1995 enrolment}}$.

1. "Good practice" countries are United Kingdom for 0-5 year-olds, France for 15-19 year-olds and Norway for 20-24 year-olds with participation rates of respectively 41.1%, 86.1% and 37.2%.
2. Enrolments in university doctoral programmes are not included.

Sources: OECD Education Database; United Nations demographic estimates (1990 to 1995); United Nations Population Division, Medium variant population projections (1996-2005).

BEST COPY AVAILABLE

Data for Figure 1.3
Proportion of the adult population 25-64 years old that is "at risk" (percentage of the total adult population)

	Adults with less than upper secondary education (1996)	Adults below literacy level 3[1] (1994)
Australia	43.05	
Austria	28.67	
Belgium[2]	46.55	
Canada	23.59	43.11
Czech Republic	15.61	44.68
Denmark	33.91	
Finland	33.21	
France	39.78	
Germany	18.53	
Greece	55.83	42.92
Hungary	36.84	
Ireland	49.78	
Italy	61.83	59.49
Korea	38.92	
Luxembourg	70.69	
Netherlands	37.46	
Norway	18.41	37.86
New Zealand	39.82	
Poland	26.26	51.16
Portugal	79.59	78.95
Spain	69.76	
Sweden	25.80	
Switzerlands (French)		25.48
Switzerlands (German)	19.83	43.59
United Kingdom		49.51
United States	11.69	51.33
	14.34	48.29

.. Data not available

1. Estimated from the 1994-95 International Adult Literacy Survey (IALS) results for document scale, which tested the knowledge and skills required to locate and use information contained in various formats such as official forms, timetables, maps and charts. Performance is assigned to one of five literacy levels; literacy level 1 indicates least proficient, literacy level 5 indicates most proficient.
2. Data for adults below literacy level 3 refer to Belgium (Flanders).

Source: OECD Education Database; OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.

Data for Figure 1.4
Trends in expenditure per student and enrolment, 1990-95
(1990=100; US dollars converted using purchasing power parities)

	Pre-primary		Secondary		Tertiary	
	Expenditure per student in 1995	Enrolment in 1995	Expenditure per student in 1995	Enrolment in 1995	Expenditure per student in 1995	Enrolment in 1995
Australia			112.39	101.64	114.02	128.92
Austria	154.84	115.43	103.00	106.80	104.22	118.28
Canada	110.11	107.64			98.36	119.82
Finland	85.93	121.95	85.08	108.58	101.46	127.92
France	129.37	99.01	114.86	101.56	99.52	112.11
Ireland	134.52	88.74	121.90	109.60	90.25	149.62
Italy			84.69	89.15	68.67	129.31
Mexico			145.82	115.52	113.62	107.27
Netherlands	114.00	113.92	107.06	67.37	89.94	87.06
Spain	122.37	116.96	120.59	102.75	133.77	123.39
Switzerland			109.57	99.33	97.90	109.36
United Kingdom	110.58	114.63	95.29	105.25	73.69	178.56

.. Data not available

1. Public institutions.
2. Public and government-dependent private institutions.

Source: OECD Education Database.

BEST COPY AVAILABLE

Chapter 2

Data for Figure 2.1
Educational expectancy of children aged 3 to 6, 1996
Average number of years in pre-primary[1] and primary education (based on headcounts)

	Pre-primary	Primary	Pre-primary and primary
Australia	0.8	1.7	2.5
Austria	2.3	0.6	2.9
Belgium	3.0	1.0	3.9
Canada	1.2	1.1	2.4
Czech Republic	2.6	0.6	3.2
Denmark	3.1	0.0	3.2
Finland	1.6	0.0	1.6
France	3.0	1.0	4.0
Germany	2.6	0.4	3.0
Greece	1.2	1.1	2.4
Hungary	3.2	0.4	3.5
Iceland	2.5	1.0	3.5
Ireland	2.1	0.4	2.5
Korea	0.8	0.9	1.7
Mexico	1.4	1.0	2.5
Netherlands	2.0	1.0	3.0
New Zealand	1.9	2.0	3.8
Norway	2.9	0.0	2.9
Portugal	1.7	0.9	2.6
Spain	2.6	1.0	3.6
Sweden	2.7	0.1	2.8
Switzerland	1.8	0.3	2.1
United Kingdom	0.5	2.8	3.4
United States	2.1	0.9	3.0

1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data, and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).

Source: OECD Education Database.

Data for Figure 2.2
Participation by age of children aged 3 to 6, 1996
Net enrolment rates by single year of age in pre-primary[1] and primary education

	Pre-primary and primary			
	3 year-olds	4 year-olds	5 year-olds	6 year-olds
Australia	26.8	45.4	77.2	99.3
Austria	30.7	72.7	90.7	100.0
Belgium	97.7	98.7	98.4	98.7
Canada	0.0	48.2	94.1	94.8
Czech Republic	55.9	76.5	87.1	100.0
Denmark	59.6	80.4	80.3	95.2
Finland	27.4	32.4	37.9	62.7
France	100.0	100.0	100.0	100.0
Germany	53.4	78.3	81.9	89.3
Greece	12.5	54.1	77.8	92.1
Hungary	67.7	87.3	97.0	100.0
Iceland	81.3	85.1	82.5	100.0
Ireland	3.0	51.9	98.4	99.1
Korea	10.3	27.5	41.8	92.0
Mexico	11.4	51.1	85.5	100.0
Netherlands	0.1	98.7	98.6	99.5
New Zealand	87.8	96.8	100.0	100.0
Norway	57.8	67.6	72.6	92.4
Portugal	43.7	54.4	66.7	100.0
Spain	61.3	98.7	100.0	100.0
Sweden	55.2	61.0	66.2	100.0
Switzerland	5.6	27.4	79.0	99.5
United Kingdom	46.6	92.1	99.6	99.5
United States	37.9	63.3	100.0	99.1

1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data, and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).

Source: OECD Education Database.

Data for Figure 2.3
Financing pre-primary education[1], 1995 (public and private funding)

	Pre-primary education expenditure as percentage of GDP		Average number of years in pre-primary education	Expenditure per child US dollars converted using PPPs
	Public expenditure	Private expenditure		
Denmark[2,3]	0.78	0.20	3.1	4 964
Hungary	0.71	0.08	3.1	1 364
France	0.67	0.03	3.0	3 241
Sweden[4]	0.56	0.00	2.6	3 286
Czech Republic	0.55	0.07	2.6	3 286
Austria[5]	0.42	0.05	2.3	4 907
Mexico	0.41	0.08	1.4	1 088
Germany[2]	0.39	0.05	2.6	5 277
Ireland[5]	0.38	0.02	2.1	2 107
Netherlands[6]	0.37	0.01	2.0	3 021
Spain[5]	0.34	0.11	2.6	2 516
Canada	0.21	0.01	1.3	5 378
Japan	0.08	0.09	2.5	2 476
Korea	0.03	0.11	0.8	1 450

1. The data refer to pre-primary education, which is limited to organised centre-based instruction programmes primarily covering children aged 3 to compulsory school age. Programmes organised as daycare, play groups and home-based structured and developmental activities are not included in these data, and programmes organised through health or social welfare ministries or privately are not, in all countries, reported (see text).
2. Private payments to government-dependent institutions excluded.
3. Expenditure somewhat over-estimated.
4. Expenditure for age 3 and above, education component is estimated.
5. Payments of private entities other than households are excluded.
6. Expenditures for a part of basic and special education; allocation is based on number of pupils by age.

Source: OECD Education Database.

Data for Figure 2.4
Percentage of mothers aged 30-39 who work when their children are under 5, 1986 and 1997

	Single		Married	
	1986	1997	1986	1997
Austria		73.6		63.4
Belgium	52.2	64.9	51.3	71.6
Denmark	74.4		79.7	
Finland		61.6		65.9
France	60.7	60.7	53.1	56.5
Germany		52.7		47.5
Germany (FTFR)	50.3	53.7	45.2	46.5
Greece	68.0	53.4	45.2	54.4
Ireland	22.0	38.1	19.4	49.8
Italy	72.0	65.2	44.8	49.1
Luxembourg	65.1	49.3	34.2	45.4
Netherlands	32.5	64.2	31.4	58.6
Portugal	66.1	70.1	62.0	74.4
Spain	46.2	51.3	29.5	42.5
United Kingdom	20.6	43.9	37.6	61.6
United States[1]			48.0	60.2

.. Data not available.
1. Data refer to all women (single and married), aged 16 and older, with children under 6.

Sources: European Commission (1999), *Employment Performance in the Member States*, Employment rates report 1998, Brussels; U.S. Bureau of Labour Statistics (1998), *Employment Characteristics of Families in 1997*, Washington DC.

BEST COPY AVAILABLE

Chapter 3

Data for Figure 3.1
Spending on learning resources in primary and secondary education

	Expenditure per student: constant US$			
	1995-96	1996-97	1997-98	1998-99
UNITED KINGDOM				
Total		**127.00**	**127.83**	**135.81**
Software		4.93	5.72	6.78
Hardware: Internet, etc.		24.67	25.97	31.78
Textbooks, worksheets, etc.		97.40	96.14	97.25
Textbooks		33.80	33.78	34.05
Teaching aids, books, worksheets, etc.		63.60	62.36	63.20
UNITED STATES				
Total	**188.90**	**204.05**	**211.96**	
Software: courseware	23.42	25.44	25.86	
software	15.69	17.51	17.74	
Comprehensive courseware	7.72	7.93	8.12	
Hardware: distance learning, telecommunications	70.26	79.27	83.04	
Hardware	46.84	53.76	55.09	
Distance learning	19.91	21.01	22.21	
Telecommunications	3.51	4.50	5.74	
Print material	95.22	99.34	103.06	

The definitions used in the U.K. and U.S. surveys are similar, but not identical.
Expenditure per student is calculated by dividing total expenditure by category, by primary and secondary school enrolments for the reference years.

Sources: British Educational Suppliers Association (1999); Education Market Reasearch (1999); OECD Education Database.

Data for Figure 3.2
Number of students per computer, 1996 to 1998

	Primary			Secondary		
	1996	1997	1998	1996	1997	1998
Belgium (Flem. Com.)			25			13
Denmark [1]		17	14		13	9
Finland [1]			11			7
France			31			10
Ireland		37	18		16	8
Italy			51			14
Japan [2]		42	32		16	14
Korea			20			24
Netherlands [1]		34	23			16
New Zealand	16	12		8	7	
Norway [1]		19			6	
Portugal		150			65	35
Sweden [1] [4]		13			6	
United Kingdom [4] [5]	19		16	9		9
United States		8			7	

1. Primary and lower secondary level combined. This likely leads to over-estimates of access when compared with other countries, as secondary education data refer only to the upper secondary level and primary education data include lower secondary level.
2. Data for secondary education refer to lower secondary only.
3. Ratio of students per instructional computer.
4. 1996 data refer to England only, covering 82% of U.K. schools.
5. Secondary level data refer to general upper secondary. In 1998, the number of pupils per computer in upper secondary vocational education was about 3.

Sources: Belgium (Flemish Community), Finland, France, Ireland, Italy, Japan, Korea, New Zealand, Norway, Portugal and Sweden: National Ministries; Netherlands: Dutch ICT-Monitor and Ministry of Education and Science; United Kingdom: British Educational Suppliers Association (1998), *Information and Communications Technology in UK Schools*; U.S.: Quality Education Data (1998), *Technology in Public Schools*.

Data for Figure 3.3
Percentage of schools connected to the Internet, 1996 to 1998

	Primary			Secondary		
	1996	1997	1998	1996	1997	1998
Austria		14	23			75
Belgium (Flem. Com.)			24			72
Denmark [1]		19	42		100	100
Finland [1]			90			95
France			11			63
Ireland		14	95		69	100
Italy			36			84
Japan [2]		7	14		12	23
Korea						22
Netherlands			23			72
New Zealand [3]	55		83	85		94
Norway [1]		34	81		90	98
Portugal		2	4		30	100
Sweden [1]		56			91	
United Kingdom [3]	5		34	47		87
United States		75	88		89	94

1. Primary and lower secondary levels combined. This likely leads to over-estimates of access, as secondary education data refer only to the upper secondary level and primary education data include lower secondary level.
2. Data for secondary education refer to lower secondary only.
3. 1996 data refer to England only, covering 82% of U.K. schools.

Sources: Austria, Belgium (Flemish Community), Denmark, Finland, France, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Portugal and Sweden: National Ministries; Norway: Statistics Norway and National Centre for Educational Resources; United Kingdom: British Educational Suppliers Association (1998), *Information and Communications Technology in UK Schools*; U.S.: National Centre for Education Statistics (1999).

BEST COPY AVAILABLE

Data for Figure 3.4
School poverty and Internet use in the United States, 1996

Classification of school districts by number of poor students:	Students' use of internet	Teachers' use of internet
More than 70 per cent of students eligible for federally-subsidised lunch	52	82
31 to 70 per cent of students eligible for federally-subsidised lunch	65	94
11 to 30% of students eligible for federally-subsidised lunch	77	95
Fewer than 11% of students eligible for federally-subsidised lunch	73	92

Source: Unpublished tabulations from 1996 Advanced Telecommunications in U.S. Public Schools Survey, U.S. Department of Education, National Center for Education Statistics.

Data for Figure 3.5
Students' computer use, 1995
Frequency of computer use at home, school or anywhere else by students in their final year of secondary school

	Frequency of use			
	Rarely or never	Monthly	Weekly	Daily
Australia [1]	25	13	28	34
Austria [1]	34	7	39	20
Canada [1]	21	16	34	28
Czech Republic	62	9	20	9
Denmark [1]	18	14	41	27
France [1]	48	17	25	10
Hungary	65	4	19	12
Iceland [1]	19	15	40	26
Italy [1]	56	10	23	12
Netherlands [1]	26	13	34	26
New Zealand	27	17	27	29
Norway [1]	54	13	19	14
Sweden	32	18	31	19
Switzerland	38	9	24	28
United States	27	16	27	31

1. Countries did not satisfy one or more guidelines for sample participation rates or student sampling.

Source: International Association for the Evaluation of Educational Achievement, Third International Mathematics and Science Study (IEA/TIMSS), 1994-95. Tabulation from OECD (1998), *Education at a Glance*, OECD Indicators 1998.

Data for Figures 3.6 and 3.7
Teachers and students' Internet use in the United States, 1998[1]

	Frequency of use				
	Never	Bi-monthly or less	Monthly	Weekly	Daily
Percentage of teachers who say they use the Internet for instructional applications:					
– curriculum materials	9.6	2.6	21.9	49.1	16.8
– professional development	23.0	8.5	22.6	32.5	13.4
– presentation tool	35.6	6.9	22.6	29.5	13.4
– lesson planning	24.9	7.3	23.4	34.9	9.6
– research	5.4	5.4	20.2	48.3	20.7
Percentage of teachers who say their students use the Internet for classroom applications:					
– e-mail	68.6	4.2	8.0	11.0	8.2
– online projects	48.7	12.8	17.8	14.8	5.9
– research	14.4	6.8	29.6	37.3	11.9

1. Data are based on teacher reports of Internet use.

Source: Quality Education Data (1998), *Internet Usage in Public Schools 1998*, 3rd edition.

BEST COPY AVAILABLE

Chapter 4

Data for Figure 4.1
Growth in tertiary education enrolment, 1990-96

	Index of change in enrolment (1990=100)		
		Attributable to change in	
	Total 1996	size of the youth cohort	enrolment rates
Australia	129	100	130
Austria	120	97	126
Denmark	121	100	123
Finland	130	91	142
Ireland	151	107	142
Mexico	122	113	108
Netherlands	110	91	123
New Zealand	141	97	145
Portugal	244	105	234
Spain	137	101	137
Sweden	141	99	143
Switzerland	112	98	116
United Kingdom	181	93	192
United States	106	95	111
Country mean	**140**	**100**	**140**

The impact of demographic change on enrolment is calculated by applying the enrolment rates (by single year of age) as measured in 1990 to the population data for 1996. The impact of changing enrolment rates is calculated by applying the enrolment rates (by single year of age) as measured in 1996 to the population data for 1990.

Source: OECD Education Database. The data come from a special survey carried out in 1997. Countries were asked to report data according to the same definitions and coverage for 1990 and 1996. Comparable data over this period are not available for Germany, owing to the reunification process.

Data for Figure 4.2 **Participation in and completion of tertiary education by parents' educational level, 1994-95**

Enrolment by today's young people aged 19 to 24 years old

	Parents' educational level		
	Below upper secondary	Upper secondary	Tertiary
Belgium	26	44	61
Denmark	12	13	30
Finland	8	12	37
France	22	35	68
Greece	10	28	53
Ireland	12	30	54
Italy	17	46	61
Netherlands	16	26	43
Portugal	20	51	73
Spain	22	49	63
Sweden	15	25	55
United States[1]	43	64	75

Data come from national surveys in Denmark, Finland and Sweden; from national labour force surveys in other countries.
1. Data refer to 18 to 24 year-olds.

Sources: EURYDICE (1997), *Key Data on Education in the European Union* 1997, European Communities, Luxembourg. Data for Figure F19, U.S. Bureau of the Census (1995), *Social and Economic Characteristics of the Population: School Enrolment*, October 1994, Current Population Reports, Series P-20, Table 17.

Completion in two adult age groups ("unequal chances" ratio)

	Younger age group (26-35 years old)	Older age group (46-55 years old)
Australia	2.4	1.9
Belgium (Flanders)	2.6	4.4
Canada	2.9	2.2
Germany	2.9	2.4
Netherlands	3.3	4.3
New Zealand	2.8	2.0
Poland	6.6	..
Sweden	2.8	2.6
Switzerland	4.3	5.6
United Kingdom	3.3	3.1
United States	3.6	4.6

.. Data not available.
"Unequal chances" ratio is calculated by dividing the chance of getting a tertiary degree or qualification if at least one parent obtained one by the chance of doing so if neither parent completed secondary education.

Sources: For Germany: Socio-economic panel, 1996; for all other countries: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.

Data for Figure 4.3
Growth in participation of young adults in tertiary education by socio-economic group, through the mid-1990s

	Average annual percentage point change	
	Total	Low socio-economic group
Belgium (Flemish Community)	1.6	0.7
France	1.2	0.6
Ireland	1.8	1.5
Japan	1.0	0.6
United Kingdom	1.8	1.0
United States	0.9	1.2

Average annual percentage point increase is calculated as the percentage point change in participation rate divided by the number of years in the reference period.

Sources: OECD Secretariat, based on country provided information for the thematic review of the first years of tertiary education and additional country-based data.

Belgium (Flemish Community): 1985-92: Data refer to students aged 18-25 in higher education (including non-university higher education). Low socio-economic group is defined as families whose heads are labourers. Ministry of the Flemish Community (1998), *Flemish Educational Indicators in an International Perspective. 1998 Edition*, Brussels; Jef C. Verhoeven and Ilse Beuselinck (1996), *Higher Education in Flanders (Belgium): A Report for the OECD*, Ministry of the Flemish Community, Brussels; Jef. C. Verhoeven (1996), *Toward Mass Higher Education in Flanders (Belgium): A Report for the OECD*, Ministry of the Flemish Community, Brussels.

France: 1982-93: Low socio-economic group is defined as students whose fathers are blue collar workers. Valérie Erlich (1998), *Les nouveaux étudiants: Un groupe social en mutation*, Armand Collin, Paris, Tableau B.

Ireland: 1986-92: Data refer to entering full-time students. Low socio-economic group is defined as unskilled workers (covering about 7 per cent of the employed population in 1986). Steering Committee on the Future Development of Higher Education (1995), *Interim Report of the Steering Committee's Technical Working Group*, Higher Education Authority, Dublin.

Japan: 1990-96: Data refer to enrolment in day courses at public and private university expressed as a percentage of 18 to 21-year olds. Tertiary-level enrolment in junior colleges and special training colleges are excluded. Low socio-economic group is defined as families in the lowest two income quintiles. The income quintiles are established from the Household Expenditure Survey for the population of families whose major income earners are 40 to 54 years old in the reference year. Family incomes are those reported by university (day course) students in Monbusho's special survey on student life, carried out every two years. Japanese researchers believe that student reporting in the Monbusho survey leads to an under-estimate of family income by students in the lower income groups and an over-estimate of the share of students in this group. Further, the reference income quintiles are estimated for a population which does not precisely match the pool of potential students, the latter including those with parents older or younger than the reference group or who are themselves older and employed. Generally, the researchers observe that there is no reason to believe that the relative magnitude of the biases and errors have changed over time so that the figures reported here should reflect changes in the underlying patterns of participation. Ministry of Education, Science and Culture (1997), *Statistical Abstract of Education, Science and Culture*, Tokyo; Motohisa Kaneko and Kazuyuki Kitamura (1995), "Towards Mass Higher Education: Access and Participation, Country Case Study - Japan", processed, Ministry of Education, Science and Culture, Tokyo (and more recent data from the special survey on student life conducted by Monbusho).

United Kingdom: 1991-97: Data refer to home domiciled initial entrants aged under 21 to full-time and sandwich undergraduate courses of higher education in further education and higher education institutions expressed as a proportion of the averaged 18 to 19 year old population. Low socio-economic group is defined as unskilled. The 1991 Census provided the population distribution by social class for all years. Office for National Statistics (1999), *Social Trends*, London.

United States: 1990-1996: Data refer to dependent family members aged 18 to 24. Low socio-economic group is defined as the lowest income quartile. Mortenson Research seminar (1999), "Educational Opportunity by Family Income, 1990 to 1997", *Postsecondary Education Opportunity*, No 86, Oskaloosa, Iowa.

BEST COPY AVAILABLE

Data for Figure 4.4

Adult participation in tertiary education, 1994-95[1] Participants as percentage of population

	Total	Age		Gender		Educational attainment			Occupation		
		30 to 44 years-old	45 to 64 years-old	Male	Female	Upper-secondary	University and other tertiary, first-degree	University post-graduates	Managers and professionals	Technicians and clerks	Blue collar and low skill services workers
Adults aged 30 - 64 years old seeking tertiary-level qualifications[2]											
Belgium (Flanders)	0.9	1.1	0.6	0.8	1.0	1.1	0.6			0.7	1.3
Canada	5.8	6.3	5.0	7.2	4.6	1.4	10.8	6.4	11.3	1.3	2.6
Netherlands	3.3	4.2	2.0	4.2	2.2	1.7	6.1[a]		6.1	2.1	2.0
New Zealand	8.1	10.3	4.5	4.7	11.4	5.5	9.1	14.2	12.9	9.7	4.7
Poland	1.7	2.6	0.4[b]	1.3	1.9	0.4	3.7		6.1[c]	1.8	1.8[d]
Sweden	4.9	6.6	2.7	3.3	6.6	4.0	6.2		6.2	4.2	1.5
Switzerland[e]	0.9	1.2	0.5	0.8	1.0	0.4	2.4[f]	2.1	1.6	0.5	0.7
United Kingdom	7.5	9.9	4.1	6.1	9.9	3.3	10.5	12.9	8.7	9.1	4.2
United States	4.2	7.2	1.1	4.1	4.2	2.4	6.6	4.6	5.8	6.5	3.9[d]
Adults aged 30 - 64 years old following any course offered by a tertiary education institution[3]											
Belgium (Flanders)	4.0	3.5	7.6	4.2	3.9	0.7	7.7	43.2	8.7[c]	4.9	4.5
Canada	7.2	9.0	5.7	10.2	4.4	3.0	9.4	16.6	16.6	1.7	4.0
Netherlands	7.2	8.3	5.8	8.8	5.3	3.2	13.9[a]	12.2	14.5	6.2	2.4
New Zealand	18.1	20.0	15.2	14.4	21.9	11.5	20.7	33.9	30.9	22.1	12.9
Poland	3.1	5.1	0.2	2.6	3.5	0.9	6.5	6.1	7.0	4.2	5.8
Sweden	..	..	..	..	..	..	..	..	..	..	..
Switzerland[e]	4.5	3.9	5.2	5.5	3.5	2.5	8.3[f]	13.1	8.8	4.2	3.0
United Kingdom	9.1	11.0	6.4	7.0	12.4	2.8	11.6	28.2	12.3	11.8	2.3
United States	10.9	13.6	8.2	10.1	11.6	5.7	15.4	21.9	18.7	12.6	6.4

Participation rates are calculated by dividing the number of adults in an identified sub-group participating in tertiary education by the total number of adults in the sub-group.

1. Estimates are based on responses in a background questionnaire for the International Adult Literacy Survey. Countries adapted individual items to reflect the options available within their borders. Participation in any form or of any duration is recorded, and no account is taken of the intensity of the learning activity or the learning realised. Biases introduced through sampling and response errors, non-response, or coding differences limit confidence in the point estimates. Depending on country, participation rates may be over or under-estimated by 10% or more.

2. Based on responses to the question "Were you taking this training or education towards ...". University-based and other tertiary education qualifications (sub-degree through advanced degree or certificate) are included; trade/vocational diplomas or certificates are excluded.

3. Based on responses to the question "Was this training given by ...". University and other tertiary education institution are included; fully private college/business college is excluded. Background questionnaire used in Sweden did not request this information.

a. Only university first-degree.
b. Only 55-64 years old.
c. Only professionals.
d. Only low-skill services workers.
e. German and French combined (95% of population).
f. Only non-university, tertiary.
.. Data not available.

Source: OECD and Statistics Canada, International Adult Literacy Survey, 1994-95.

Data for Figure 4.5

Split between university and other tertiary education, 1990 and 1996

Enrolments for first degrees or diplomas (percentage)

	Index of growth in enrolment first-degree or diploma programmes (1990=100)	1990		1996	
		University	Other tertiary	University	Other tertiary
Australia	124	49.2	50.8	54.6	45.4
Austria	115	92.0	8.0	91.3	8.7
Canada	118	63.6	36.4	52.4	47.6
Denmark	128	86.1	13.9	82.2	17.8
Finland	131	74.5	25.5	79.0	21.0
Iceland	122	87.5	12.5	82.6	17.4
Italy	130	94.8	5.2	97.3	2.7
Japan	120	66.4	33.6	67.7	32.3
Korea	121	79.8	20.2	66.8	33.2
New Zealand	133	58.0	42.0	68.0	32.0
Norway	137	55.0	45.0	59.0	41.0
Poland	223	78.2	21.8	84.0	16.4
Spain	134	100.0	n	97.5	2.4
Switzerland	114	55.6	44.4	53.3	46.7
Turkey[1]	172	90.3	9.7	73.2	26.8
United Kingdom	174	63.6	36.4	70.0	30.0
United States	105	56.4	43.6	55.1	44.9

n. negligible or zero.
1. 1995.

Source: OECD Education Database. Comparable data over this period are not available for Germany, owing to the reunification process. No data are available for the Netherlands, where all tertiary-level programmes are identified as university or equivalent.

BEST COPY AVAILABLE

Data for Figure 4.6.a

Share of women in first-degree or diploma programmes in tertiary education[1], early to mid-1990s

	Sciences		Engineering		Business	
	early 1990s	mid-1990s	early 1990s	mid-1990s	early 1990s	mid-1990s
Australia	41.2	43.6	12.1	13.8	44.9	50.5
France	34.4	35.8	18.9	21.5	43.9	46.7
Japan	19.8	24.4	6.9	9.1	19.8	22.0
Sweden	38.0	42.0	21.0	23.0	53.0	54.0
United States	44.8	51.2	14.2	17.5	56.4	59.9

1. Owing to differences in the ways fields are classified and the years covered, the data are not comparable across countries. Comparable data over this period are not available for Germany, owing to the reunification process.

Sources: OECD Secretariat, based on country-provided data for thematic review of the first years of tertiary education and additional country-based data.

Australia: 1990 and 1996. Data refer to commencing students, some of whom may already have tertiary-level experience of qualifications. The data cover enrolment in institutions in the Unified National System; tertiary enrolments in other institutions are not included. The fields, respectively, are: science; engineering, surveying; business administration, economics. V. Lynn Meek and Fiona Q. Wood (1998), *Managing Higher Education Diversity in a Climate of Public Sector Reform*, Department of Employment, Education, Training and Youth Affairs, Canberra, Table 8.14.

France: 1989 and 1992. Data refer to students in universities, engineering schools and business schools. Students in CPGE, STS and IUT programmes are not included. The fields, respectively, are: science (university), engineering (in schools within and independent of universities), and economics (university) and business schools. Valerie Erlich (1998), *Les nouveaux étudiants, un groupe social en mutation*, Armand Collin, Paris, Tableaux III. IV and other available statistics.

Japan: 1992 and 1996. Data refer to undergraduate enrolment in universities and junior colleges. Tertiary-level enrolments in special training colleges are not included. The fields, respectively, are: sciences, engineering, and business and economics. Ministry of Education, Science and Culture (1997), *Statistical Abstract of Education, Science and Culture*, Tokyo, pp. 76-79 (and earlier years), and other country-based data.

Sweden: 1993 and 1995. Data refer to new entrants. The fields, respectively, are: natural science, technology and natural science; professional degree studies, law and social science. National Agency for Higher Education and Statistics (1998), *Women and men in higher education – from upper secondary to postgraduate training 1986/87 to 1995/96*, Stockholm, p.40.

United States: 1989 and 1995. Data refer to undergraduates who are U.S. citizens, in any type of tertiary education institution. The fields, respectively, are: life sciences and physical sciences, engineering and business management. National Center for Education Statistics (1999) "National Student Post-secondary Aid Study 1989-90 and 1995-96", Data Analysis System, unpublished tabulations.

Data for Figure 4.6.b

Share of women in all post-graduate enrolment, 1990 and 1996

	Index of growth in post-graduate enrolment (1990=100)	Women as share of all post-graduate enrolment	
		1990	1996
Australia	176	47.1	51.2
Austria	193	32.1	37.2
Canada	117	44.8	48.1
Denmark	111	43.8	47.3
Finland	117	45.7	45.0
Hungary	351	34.5	41.1
Italy	66	34.4	51.1
Japan	180	19.3	21.5
Korea	145	22.4	28.7
Netherlands	105	40.0	44.9
New Zealand	214	51.0	50.0
Norway	143	44.6	47.2
Spain	227	34.4	47.8
Sweden	127	32.9	37.1
Switzerland	95	30.2	32.6
Turkey[1]	165	34.2	35.6
United Kingdom	221	39.4	46.2
United States	113	51.0	53.6

1. 1995.

Source: OECD Education Database.

BEST COPY AVAILABLE

ALSO AVAILABLE

Lifelong Learning for All (1996)
ISBN 92-64-15815-9
FF255

Redefining Tertiary Education (1998)
ISBN 92-64-16055-8
FF150

Human Capital Investment (1998)
ISBN 92-64-16067-1
FF150

Education at a Glance – OECD Database 1999
ISBN 92-64-16775-7
FF500

Measuring Student Knowledge and Skills (1999)
OECD Programme for International Student Assessment (PISA)
ISBN 92-64-17053-7
FF150

Overcoming Exclusion through Adult Learning (1999)
ISBN 92-64-17026-X
FF160

Innovating Schools (1999)
ISBN92-64-17021-9
FF140

OECD PUBLICATIONS, 2, rue André-Pascal, 75775 PARIS CEDEX 16
PRINTED IN FRANCE
(96 1999 09 1 P) ISBN 92-64-17136-3 – No. 50921 1999

CENTRE FOR
EDUCATIONAL RESEARCH
AND INNOVATION

EDUCATION POLICY ANALYSIS 1999

To meet a continuing growth in demand for learning, OECD countries seek to provide a wider array of education and training opportunities for learners in their earliest years through adult life. Has increased participation in education and training in the 1990s met the demand for lifelong learning? What gaps remain, and for which learners and in which types of learning? What are the most promising policy directions to encourage the expansion of learning opportunities that respond to learning aims and learner needs? How can policies help marshal the resources needed for the investment in learning and to encourage their efficient use? This 1999 edition of *Education Policy Analysis* explores these and other questions.

Drawing on the policy experience and trends in OECD countries, the four chapters in this book cover:

- projections of growth in participation in formal education and training to meet lifelong learning targets, and implications for costs;
- policy options to secure the benefits of early childhood education and care;
- the uses of ICT in education;
- tracking participation from under-represented groups in tertiary education.

www.oecd.org

(96 1999 09 1 P) FF 120
ISBN 92-64-17136-3

BEST COPY AVAILABLE

99